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LIGHT ✦ HEAT ✦ POWER ✦ BYE-PRODUCTS

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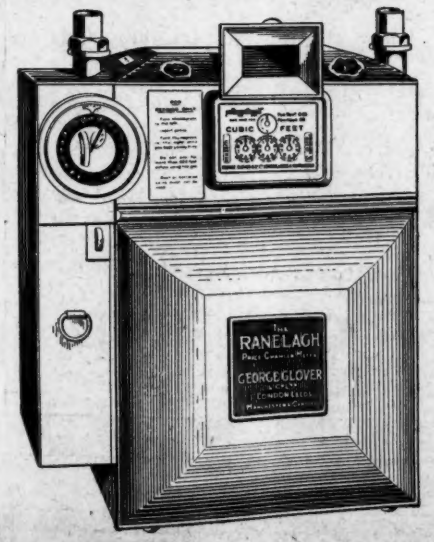

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VOL. CLVIII., No. 3084.] WEDNESDAY, JUNE 21, 1922. [74TH YEAR.

WALTER KING.

IT IS with deep personal sorrow and a sense of great loss that we have to announce the death of our Chairman, Mr. WALTER KING, at his home at Frinton-on-Sea, early last Sunday morning. He was in his seventieth year, and had been ill for some months. Early this year it was necessary for him to undergo an operation in a nursing-home in London. The operation was surgically successful; but the trouble had so undermined his health and sapped his vitality, that time only increased his weakness, and the end came as recorded above—happily free from pain. We will say but little—this we know so well would be in accord with his wishes, could the silent tongue express them—of Mr. King's long connection with the gas industry, as the sole proprietor of the "JOURNAL" until the end of last year. That association began immediately after he left King's College some fifty-four years ago, when he at once entered upon his training for technical journalism under his father, Mr. William Boughton King, who (in succession to the founder, Thomas Barlow) preceded him in the proprietorship of the "JOURNAL." On the death of his father the property passed into the hands of Mr. Walter King, and with it the responsibility of the editorship. In those days the paper could hardly be said to be a paying venture; and it was only the perseverance and courage of the late proprietor that enabled the "JOURNAL" to become what it has been and is to the gas industry, whose fullest history may be found in its pages. How well, how generously, and with what self-sacrifice—material as well as personal—Mr. King devoted himself to the interests of the industry, none but those who knew him intimately could tell. He never flinched from making a stand when he believed the cause was right, and the occasion demanded. About all such matters, however, he was very reticent. His work is done; and to it honour attaches. We of the "JOURNAL" staff who have worked with him long know well his boundless good nature, and the strength and help of his friendship.

To the family our sympathy is extended.

Boys' Recording and Integrating Calorimeter.

AT last year's meeting of the Institution of Gas Engineers, held in the autumn, some doubt was expressed as to whether a perfectly satisfactory recording calorimeter would ever be developed. It was known that Prof. C. V. Boys, F.R.S., was working hard at achieving the credit of producing what was required; and at this year's meeting of the Institution, he will be describing the results of his work. But within a week of the day on which he (according to the programme) will be introducing his novel recording and integrating calorimeter to the professional gas engineers of the country, the patent specification of the instrument was published; the applicants for protection being the Board of Trade and the inventor, who is one of the Gas Referees appointed by the Board of Trade under the Gas Regulation Act.

It is believed that what has been accomplished in this instrument has been done for the first time. The general object sought in devising it has been, as will be seen from the extract (printed in later columns) from the patent specification, to obtain a continuous record of the gross calorific power of gas in relation not only to actual volume, but to corrected volume. Besides the continuous record, an integrated value is given of the departure of the average value, since the instrument was previously read or set, from some specified or declared value. All the operations of the instrument are effected positively, and none inferentially, and with means comprised in the apparatus for verifying the measuring capacity of the instrument for gas volume, water quantity, and rise of temperature by direct reference to standard measuring vessels and thermometers. A special calorimeter of the flow type is employed, with a new series of interconnected operations, and new elements, which will be found described in the extract from the patent specification. The calorimeter is of simple construction, but has two novel features of special importance in a continuously working instrument. Much less gas than usual is burned in the instrument, and so losses of heat due to imperfect jacketing would be proportionately more serious. However, by the use of a highly conducting shield, there is obtained the same effect as would be produced by a perfectly insulating jacket; and thus, as explained, all heat loss is avoided. It is obvious

that Prof. Boys has in his design benefited from the experiences of others—particularly in regard to the corrosive and solvent action of the acid products of combustion on the metal work. The calorimeter can be adapted, by means of the water-measuring vessel, to show how far a particular gas departs from some particular declared value; or it may be arranged to give a record of the calorific value of the gas in direct terms, irrespective of any declared value. The same record paper is adaptable for either type of use.

Naturally at the moment, knowledge of the invention being confined to printed description, it is impossible to comment upon its features; but a perusal of what is printed elsewhere will show the valuable characteristics, providing all work out as specified. We know Prof. Boys has been, from the time of the prescription in the Gas Regulation Act, labouring assiduously at the problems presented by the designing of a satisfactory recording calorimeter; and positive it is that the new instrument would not have reached the present stage in patenting had there not been satisfaction on the part of the inventor that he had realized success. This short intimation will be sufficient to turn the attention of readers to the description taken from the patent specification. The importance of the subject to the gas industry is large, in view of the prescription in the Act of recording calorimeters for constantly standing between the supplier and the consumer of gas purchased on the therm basis.

First Official Use of a Continuous Calorimeter.

FROM the Gas Referees there has been received an advance copy of the special provisional prescription applying to the Brentford Gas Company, in relation to the use of continuous calorimeters. This prescription is of considerable interest as being the first official use under the Gas Regulation Act of calorimeters for producing a continuous record of the calorific value of gas supplied by a gas undertaking. The testing-places are specified; and then the duties and the times of testing are dealt with. The continuous calorimeter provisionally prescribed for the Brentford and Southall stations is the Fairweather. The instruments have been already provided by the Gas Company; and with them there must now have been a large experience. This being the first instrument specified in a prescription, appears to indicate that experience with it is so far of a satisfactory nature. But it will be noted from the Referees' prescription that there is nothing definite as to permanence. The calorimeter, it says, shall, "for the present," be that already provided in each testing-place. Then at the prescribed testing-places at Southall and Staines, also "for the "present," there are to be used two Boys non-recording calorimeters as already provided—that at Southall being additional to the recording instrument. Should the Gas Examiner at any time suspect that the results are not trustworthy on account of any defect in the instruments, he is at once to notify the Gas Referees. Apparently the date of the official advent of the recording instrument is July 1; as it is provided that "it shall be handed over [by the makers] "to the Gas Company on July 1, 1922, in satisfactory run-"ning order." Instructions appear as to the attention to be given to the recording calorimeters on the occasion of making the first verifying test each week. The Boys non-recording calorimeters, it is noted, are to be used generally as described in the "Notification" of the Gas Referees for 1912; but the period during which the calorimeter burners shall remain alight before the Gas Examiner makes his observations is to be 45 minutes, instead of 30 minutes. Directions are supplied as to the making of reports and the publication of results. The various sections of the prescription contain the fullest detail as to requirement; and the only possible danger of the Gas Examiners or of the Gas Company going astray will be through inadvertent neglect of any point in the extensive, but carefully designed, information for their guidance.

Change Reflected in "Field's Analysis."

IN other columns we review "Field's Analysis" for 1921, having been favoured by an advance proof copy. The investigation of the work has been highly instructive, owing to the fact that this particular issue mirrors the transition stage from the old to the new order in the gas industry. Many men in the industry have been waiting with interest for this issue of the famous work, to ascertain how the Editor (Mr. H. E. Ibbs, the Chief Accountant of the Gas Light and Coke Company) would deal with the changed circumstances. He has been equal to it. He has tried to satisfy even those who did not agree with his original views as to what should be done; and he has shifted his ground so far as to admit that his research into the position has led him to decide that, in the "declared" calorific value per cubic foot, there is more stability than there would be in the "supplied" calorific value. Therefore, he has rendered many of the figures on the customary basis of per 1000 c.ft. of gas sold, as well as on the basis of the therm—utilizing the "declared" value, except where the "supplied" figure is at present the only one available. Mr. Ibbs at one time was leaning towards making his calculations on the supplied value, on the ground that every undertaking should have its full due, and not the under-measure there must be in basing the tale of production and supply on the declared value. He found, so it is understood, that there were many practical difficulties in the way of doing what he first suggested, not the least of these being that it might not always be possible in future to obtain the information required with regard to the calorific value supplied in the case of every undertaking.

Of course, it would never do for "Field's Analysis" to be permanently produced in some cases on the declared, and in others on the supplied basis. We see this in the present issue—some of the computations being on the declared value, while others were made on the supplied measurements. This was unavoidable on this occasion; but as declarations are made, irregularities will be removed, and uniformity will succeed. There would not, of course, be so much objection to this if operations had settled down, and gas undertakings were all working to narrow margins between the declared and the supplied power. But at present there are some concerns working with startling margins, which suggest not perhaps that they have plenty of heat units they can afford to give away, but that their current working conditions will not permit them to operate to a calorific value closer to the declared figure. In view of this evidence of large margins, the wisdom of first choice of declared power is not very plain. However, all these things that are abnormal at the present time will become normal, and the big divergencies from declared values will be reduced to a generally finer point. This brings us back to the fact that Mr. Ibbs thinks it might not always be possible in future to obtain the information required with regard to the actual calorific value of the gas supplied in the case of every undertaking. While we are not going to question Mr. Ibbs' selection of the declared value as being the safest, in future it will be up to every gas undertaking to make calorific tests on the works in order to control its manufacturing operations, and so keep the calorific value per cubic foot as close to the declared as is warranted by the conditions of the district, distribution system, and the composition of the gas. The prudence of the decision is not in question; but the old statutory principle that gas should be so burned in testing as to give credit to it for its maximum illuminating power (a principle which led to the development of the Carpenter "Metropolitan" No. 2 burner) holds good in testings for calorific value. So it seems to us that the same credit should in some way be given to gas undertakings for the calorific value actually supplied by them to consumers.

Another impression noted in reviewing the "Analysis" is that a perusal of the results given side by side on the two bases must effect a change in our view-point. They prove conclusively that all comparisons on the per 1000 c.ft. basis will—gradually perhaps, but surely—be added to the vast accumulation of things that have been, but for which we have no longer any use. The therm positively attests that all comparisons per 1000 c.ft. are misleading. They are meaningless, unless the calorific value accompanies, and then there is the trouble of making a reckoning; whereas the therm is 100,000 B.Th.U. in every case, and the figure supplies us with a uniform calculating basis. This is illustrated in the review by a comparison of the cost of coal and oil at per 1000 c.ft. and per therm. A little table has been constructed showing the order of merit of a number of concerns under both headings; and the order of merit per 1000 c.ft. is not that at per therm. Some of the companies only move a single place in the comparison—like the Gas Light and Coke Company, who are fourth in the order of merit in the cost of coal and oil per 1000 c.ft., and third in the calculation at per therm. Tottenham takes second place per 1000 c.ft., but seventh per therm. Wandsworth

and Richmond are the only companies that maintain their places both per 1000 c.ft. and per therm. A significant instance is the South Metropolitan Company, whose position in the order of merit per 1000 c.ft. is eighth; but per therm first place is taken, with 7·804d., and this with a calorific value of 550 B.Th.U. The South Metropolitan Company is an all-coal-gas one; and the others, we believe without exception use oil, which during a part of 1921 was at a higher price than it is to-day. Of course, one cannot draw any definite conclusions from a single year's operations as to whether coal alone or coal and oil will show superiority per therm in the matter of low cost for materials. Several factors intrude which vary from year to year. However, we will leave students of costs to study the relative positions of the other companies under the two headings; and they will not, we are confident, be able to draw any other conclusion than the one we have, that practically useful information can only be obtained from an examination of costs on the therm basis.

Another interesting figure is the tremendous drop in the percentage of residuals on the cost of coal compared with 1920. It was 51·19 p.ct. in 1921, compared with the exceptional 81·63 for 1920; but it was only a little over 6 less than the average for the preceding six years. Attention is drawn in the review to other interesting features; but our principal desire in this article is to emphasize the greater reliability of the therm than the volumetric unit in making comparisons. Here, however, as we have done elsewhere, we should like to acknowledge the indebtedness of the gas industry to Mr. Ibbs and his staff for the labour and interest they have put into the new issue of this standard work.

The Birkenhead Engineership.

OFFICIAL service under municipal bodies is largely brought into disrepute among professional men by the actions of the councils themselves. As, however, we have in fairness said on previous occasions, there are municipal bodies under whom men work with pleasure and pride. But this is far from generally the case; and we not only fear, but know, that the conditions of professional service have not become more tolerable with the developments in trade unionism and the changes in the constitution of our local governing bodies. We are not going to place the Birkenhead Corporation in either of the categories of bodies to which reference has been made. Every reader must judge for himself, and on the most general of facts, seeing that the Birkenhead Gas Committee have a strong inclination, upon which they effectively act, to secretive procedure. We have seen hints in the newspapers the last few months of secret investigations into the management of the department, and there has been mention of a report which has also, with the utmost care, been kept secret. We have had information that the Engineer and Manager (Mr. R. H. Brown) has resigned his office; and there is little doubt that this is the outcome of the inquiry and the report, and of the impossibility of continuing in a position which is such that a professional man feels he cannot, through the obsession of local circumstances, bring to bear upon his work the best that is in him.

Looking back, it seems to us that the Birkenhead Gas Committee are particularly fond of secret inquiries; and we are rather afraid that a good deal of the trouble that is investigated has its origin in political animosities and activities. It is, of course, only possible to speak as outside observers. But we recall that an inquiry into the management of the Gas Department resulted in the resignation of the late Mr. T. O. Paterson, who was a man held in very high esteem throughout the gas profession. Now we have again the spectacle of his successor resigning under very similar circumstances, after fifteen years' service in the department, the last six of which, and the years that have taxed the greatest endurance of men, he has been the chief. The unfairness of inquiries of the Birkenhead kind is that the resulting report is kept absolutely covert, and so no opportunity is allowed the Committee's culprit (if that is the suitable expression) to challenge the findings, and no means are available to him to make appeal to a disinterested court, with the view of defending his professional reputation and honour. This is unjust—more particularly in these days when the holder of an important office under a municipal body is subjected to more conditions of an irksome nature than at one time obtained.

The record that Mr. Brown has established for himself during his tenure of the chief office in the Birkenhead Gas Department can be found in the annual reports of the Committee; and those reports do not disclose to us that he has done any other than the best possible under the conditions with which he was environed. On the strength of those annual reports, we would suggest, as Birkenhead appears to have a *penchant* for inquiries, that there should be one into the administration of the Committee, and that it should be conducted by a perfectly independent and competent body of gas experts. Then we should get to the full truth; and the ratepayers of Birkenhead would learn more than they apparently know now of the influences that seem to prevent smooth working in the Gas Department. Anyway, Mr. Brown appears to be very glad to get rid of the shackles of his professional life at Birkenhead, and to devote his energies in quite another sphere. The secret inquiry, the secret report, and the change of chief engineer and manager come after a succession of difficulty-laden and anxious years—the worst, in fact, to which any man responsible for the working of a gas undertaking has ever been exposed. We know how Mr. Brown carried the undertaking through all the difficulties connected with the war and the bad years succeeding the Armistice, including the three months' coal strike, during which large quantities of coal were imported from America, and the gas consumers had as large a supply of gas as the consumers in any area in the country.

Another matter is the state of the plant at the works. Conditions necessitated, in 1918, consideration of the enlargement, reconstruction, and alteration of the plant, in order to maintain the supply, and to endeavour to keep down the price of gas. The matter was dealt with in a report by Mr. Brown, dated May 26, 1919, which report was accepted by the Council; and certain loans were obtained for carrying out part of the works, which, however, were temporarily deferred. The exigencies of the position compelled Mr. Brown, in a report dated Dec. 23, 1920, to press forward certain of the more important items in the scheme. This was accepted by the Council, subject to the Gas and Finance Committees agreeing as to the time and advisability for the work to be commenced. Since then the matter has been brought forward on three separate occasions; each time with the same result—further deferment. Should severe weather be experienced next winter at the time of peak load, and any accident occur to the plant, the gas supply of Birkenhead, we rather fancy, would be in serious jeopardy. It is quite possible that, had these works been undertaken at the time they were first recommended, the last increase of gas prices to cover the loss due to the coal strike would not have been necessary. The conditions suggest, too, that the large output from a relatively small plant must make it extremely difficult to keep it in a state of even reasonable repair. Nevertheless, in spite of these many and continuing difficulties, the gas undertaking has been a financial success. Since 1912, the Department has contributed to the relief of the rates no less than £69,336, compared with £31,522 by the tramways, and £4053 by the electricity concern. On the ferries there has been an actual loss of £35,959. The first figure is not a bad showing by the gas undertaking, although we do not agree with the policy of handing profits over to the rates, but rather believe in their being utilized to improve the service producing them, or to reduce the charges to the patrons of the service.

There are other matters which seem to point to usurpation, restriction, and undermining of the powers of control of the official management. If this is so, it is clear that discipline cannot be maintained under such conditions, nor can an engineer carry on the works in the most economical manner, and to the best advantage. We have sufficient evidence before us to warrant a suggestion that the whole administration of the department requires investigation by an independent and competent tribunal. Such an investigation should be a public one, and not held in secret. The matter is one of interest to the ratepayers of the borough, and the truth should be in their possession. As it is, after the resignation within a few years of (the late) Mr. Paterson and now of Mr. Brown, does the Birkenhead Gas Committee really believe that service under them will tempt applications for the position of Chief Engineer and Manager from the best qualified men in the ranks of the gas profession? We think not. In the interests of the department, matters should be cleared up openly and frankly; and there is only one way of doing this. We will not conclude without an expression of our opinion that Mr. Brown, by his resignation, has followed the most dignified course that he

could adopt. If the Committee are strong in respect of justification for the action they have taken which has led to that resignation, then why all the secrecy? Possible candidates for the position would probably like an answer to this question.

An Excess of Generosity.

ONE is always ready to admire generous people when the generosity is reasonable, and the purpose good. But there can be an excess of generosity. The Blackburn Corporation Gas Committee and their consumers have come to this conclusion. The plumbers of the borough are the beneficiaries in this particular case. It started in 1915, when the late Mr. A. Morton Fyffe was the Engineer, and when the great desire was to promote in every possible way the use of gas for domestic purposes. *Tempora mutantur.* In those days, the gas consumers were asked to employ their own plumbers when they required a gas appliance of any kind to be installed; and if the appliance so installed was a gas-fire, geyser, or wash-boiler, and was purchased from the showroom of the Gas Department, the master plumber was allowed 10 p.ct. on the price quoted to the consumer. This was a liberal arrangement—too liberal in fact. The plumbers should have been satisfied with the additional installation work that the Gas Department's showrooms brought to them; but apparently they were not. Hence the 10 p.ct. But then gas appliances were at a much lower price. Now they are at a high price; and 10 p.ct. upon them means a considerable sum. This is unfair to the gas consumers; and it cannot be doing the expansion of the business any good if the present high costs to consumers who purchase appliances have to bear in addition a 10 p.ct. charge for the master plumbers, who have had nothing whatever to do with the sale. This arrangement is not justified, and, in our opinion, it is not in the best interests of the gas undertaking. The Gas Committee are now considering the question of reverting to the old custom of installing the appliances themselves. This is a very proper thing; and we hope that the decision will go this way, and that a condition which cannot be justified will be ended. In these days, under the conditions of the Gas Regulation Act, more responsibility is thrown upon gas suppliers in respect of good performance of consumers' appliances; and therefore it will be better that the Blackburn Gas Department should take the responsibility from the stage of installation, and give consumers the benefit of any reduction in the cost of appliances that can be made by the withdrawal of the 10 p.ct.

The Locked Gates Reopened.

THE great engineering lock-out has come to an end; and the men, or as many of them as available work could absorb, have returned to their shops, from which they were shut out through the exertions of the extremists, who desired to limit the reasonable claim of the employers to exercise their indisputable rights in respect of managerial functions. In such a matter, there could have been no other end to the dispute. It was inevitable that the principles which the employers defended should prevail, though probably modified somewhat in detail. It was very much like the miners' strike—a great adventure, with no legitimate purpose, but subversive in every respect. The men, the engineering industry, and the country have lost millions of money through it; and employment, which was bad before in the industry, is now worse. It was the work of men whose aims are revolutionary; and those aims are, we feel sure—and the evidence of ballot figures seems plainly to indicate this—antagonistic to the opinions of the great number of level-headed and peacefully inclined men who are engaged in the industry. There are more of them than there are of those who support the men having altruistic views and ambitions. But we cannot exonerate from all blame the more intelligent section of the men. There is an army of them; and if they would only exercise their votes according to their judgment as to what is morally right, they would soon put these men of revolutionary views completely out of power. But they refrain, and so leave action to the determination of the actual supporters of the extremists. We admire more the 35,525 men of the Amalgamated Engineering Union who originally voted in favour of the acceptance of the employers' terms than we do the more than 300,000 who refrained from exercising their vote—many of them possibly because they could not conscientiously back-up their extremist leaders, and yet would not vote against them. But after forty-five unions who had become involved in the dispute had ballotted and accepted the employers' conditions modified in detail (only two outstanding, other than the A.E.U.), one felt that this last-named organization would not hold out longer, and could not in view of the bankrupt condition to which it had reduced itself by the fatuous policy of a section of the members. The event proved the accuracy of the forecast, which it had not been difficult to make.

A serious thing, however, about these great upheavals, and it is a point which emphasizes strongly a weakness in the trade union system, is that they—involving enormous waste, industrial set-backs, and appalling misery to a multitude of human beings—rest solely upon the determination of a comparatively small proportion of the men concerned. There are approximately 400,000 men in the A.E.U.; and yet the ballot which rejected the original conditions of the employers was only participated in by 85,765 members, or merely slightly more than 21 p.ct. of the total membership. Of that 85,765 members, 35,525 were in favour of acceptance, and 50,240 against; so that an adverse majority of 14,715 threw out of employment at least 300,000 men, assuming 100,000 members were at that date unemployed through the general trade depression. Even in the ballot which resulted in the end of the lock-out, only 114,901 men voted, or 28 p.ct. of the whole membership; those in favour of acceptance numbering 75,478, and those against 39,423. Contemplation of these figures shows the gravity of the abstentions from voting, as well as the deplorable fact that great issues to industry, and misery to enormous numbers of men and their families, are left to the determination of a small minority of those entitled to vote. The reduction by 10,817 of the number against acceptance shows that empty coffers had made stronger appeal than the voices of the extremists; and the additional 40,000 or so in favour of acceptance will make similar impression upon those seeking for a cause for the dissimilar results. We guarantee that many of the men who voted against acceptance even in this second ballot were, when they saw the game was up, among the first to seek re-employment. Our best wishes are that they are among those for whom employment fortuitously cannot be found, and that the men who cast votes in favour of acceptance have been among those fortunate enough to get employment. It should be mentioned that the Foundry Workers' Union—one of the forty-seven unions—also, immediately afterwards, accepted the employers' terms, which left only the Boiler Makers' Union still undecided.

So the thirteen weeks' lock-out of the A.E.U. comes to an end; and work was resumed as promptly and as far as possible. In some districts, the prospects of the engineering industry are bright; in others, there is a great depression, rendered worse by the stoppage. However, the industrial clouds so far as labour is concerned have, we trust, now lifted. The coalminers have had their fling over political issues, and came out of the struggle disrupted and poverty-stricken. The engineering men have had their conflict, and are the poorer for it to-day. It is an insane act to war against things and conditions in a natural system of affairs which cannot be altered without general destruction. There must be system; and system has many components, all vital to its beneficial working. Now that labour troubles are moving from the scene, we hope to see the country set to work in every part to repair the harm that has been done to it, though it must not be forgotten that under the surface the extremists are unceasingly burrowing in the attempt to foment discontent. They are doing it now in the mining and, we believe, in the transport industries. But if the lessons of monumental proportions that are now before us are duly heeded, the extremists will—and fortunately—find their vile labours nugatory in their effect.

Declared Calorific Value Increases.

Several companies have raised their declared calorific power; and the Gas Referees have intimated to them that the prescriptions in force at the present time are to apply as if the higher value were substituted therein for the previously declared value. The Brighton and Hove Company have raised their declared value from 470 to 500 B.Th.U.; the Gas Light and Coke Company, from 475 to 500 B.Th.U.; the Ilford Company, from 450 to 500 B.Th.U.; the Sheffield Company, from 480 to 500 B.Th.U.; the South Metropolitan Company, from 550 to 560 B.Th.U.; the

Tottenham Company, from 450 to 500 B.Th.U. All these except the South Metropolitan Company, in their current circumstances favour 500 B.Th.U., instead of the lower values formerly declared.

Cheaper Gas Appliances.

In an article in "THE GAS SALESMAN" supplement published this week, Mr. Thomas Newton presents the case for cheaper gas-using appliances. He holds that the demand for gas is being restricted at present on account of the price of gas appliances. Demand for them depends largely on price; and the greater the demand, naturally the lower the cost of production. The greater the demand, too, the larger the effect upon the consumption of gas; and the magnitude of the consumption of gas has a bearing upon the price at which it can be sold. Gas and gas appliances have reciprocal relationships, which should be developed to mutual advantage. The author of the article strongly urges the makers of appliances to encourage undertakings to think in thousands where they now think in hundreds.

Summer Time.

The Summer Time Bill has had second reading in the House of Commons; but not before something in the nature of a compromise was effected. The Bill provides that Summer Time shall extend from the day following the last Saturday in March to the first Saturday in October? The agriculturists appear to be dead against the rest of the community in respect of "summer time;" and, on their behalf, the rejection of the Bill was moved. During the debate, the Home Secretary announced that he was prepared to make a reduction of the summer time period by not less than three weeks at each end—in April and September. Some people think this concession is too much; and protests have already been made in the newspapers by correspondents representing the views of various sections of the community. The concession could not have been due to any feeling that the Bill was in danger; seeing that the motion for rejection was negatived in the House by 207 votes to 26.

Road Transport by Railway Companies.

The eleventh-hour disclosure made by a witness as to the attitude of the Ministry of Transport regarding road transport by railway companies, which resulted in the withdrawal of the North-Western and Midland Group Bill, has rightly been the subject of a strong protest on the part of the Select Committee who had the measure under consideration. We do not say this through any particular friendliness towards the principle of railway companies engaging in the road transport business, but because of the insensate action of the Ministry of Transport in keeping their views concealed until there had been an enormous expenditure of time and money in discussing the Bill. This is one of those questions that can only be decided (without practical experience) as a matter of principle, as there is no experience which would entitle one to say whether or not the entry of the railway companies into the road transport business would be publicly beneficial or otherwise. The Select Committee in their report state that they sat for ten days, and then drew attention to the unnecessary expense caused to the parties owing to the delay on the part of the Ministry in notifying their objection to the principle on which it was proposed in the Bill to make charges for the conveyance of goods by road. There was no criticism of the basis of charge in the Committee's original report to the Committee; and it was only on the tenth day of the Committee's proceedings that they disclosed their objection. The views of the Select Committee, after hearing the evidence, are striking. They say: "The case for the petitioners was not fully before the Committee; but, subject to the possibility of eliminating unfair competition, the Committee are unanimously of opinion that it would be in the public interest to allow the fullest possible participation by the railway companies of this group and all competitors in the service of road transport." There is something decidedly wrong with parliamentary procedure when a Bill is referred to a Select Committee for their adjudication, and, after ten days' hearing, the whole of the work done and the expense incurred are found to have been wasted owing to the action of a Government Department.

Gas Companies and Railway Electrification.

Gas companies have not frequently appeared before the Electricity Commissioners as objectors; but the South Metropolitan Company have raised before them certain interesting points, as will be seen by a report in later columns, regarding the application by the Managing Committee of the South-Eastern and Chatham Railway for the erection of an electricity generating station for supplying power in connection with the electrification of their lines. The Gas Company supply South-Eastern and Chatham railway stations with gas to the extent of £18,000 per annum; and they foresee the Railway Company competing with them for this particular business. On the other hand, if the electricity supply is taken from an outside authority which was not the authorized distributor in the area, the current could only be used for operating the trains and lighting the carriages, and not for lighting railway stations and other premises. It is an interesting point. What the Electricity Commissioners will say to it has yet to be disclosed.

PERSONAL.

The Albert Medal of the Royal Society of Arts for 1922 has been awarded by the Council, with the approval of the President (H.R.H. the Duke of Connaught and Strathern, K.G.), to Sir DUGALD CLERK, K.B.E., F.R.S., D.Sc., LL.D., in recognition of his important contributions, both theoretical and practical, to the development of the internal combustion engine. The Albert Medal was founded in 1863 as a memorial of the Prince Consort, who was President of the Society from 1843-61, and is awarded annually for "distinguished merit in promoting arts, manufactures, and commerce."

Alderman J. H. COLMER, J.P., has been elected a Director of the Bath Gas Light and Coke Company, in place of the late Mr. A. Browning.

HEARTY congratulations to Mr. and Mrs. THOMAS POTTERTON on the attainment of their golden wedding yesterday. Mr. Potterton reached his 75th birthday last April and Mrs. Potterton is only six months his junior.

The Rt. Hon. W. C. Bridgeman, M.P., Secretary for Mines, announces that, in connection with the forthcoming retirement of Mr. J. DYER LEWIS, H.M. Divisional Inspector of Mines in charge of the South Wales Division, he has promoted Mr. J. M. CAREY, at present serving as a Senior Inspector in that division, to be Divisional Inspector in place of Mr. Dyer Lewis, and Colonel J. A. S. RITSON to be Senior Inspector of Mines in place of Mr. J. M. Carey.

ELECTRICITY SUPPLY MEMORANDA.

"Electricity for All."

THREE, at any rate, of the London Borough Councils are looking into the matter of devising plans whereby they can get business for electricity from the smaller properties in their areas—whether profitable business or otherwise is a question for time to disclose. We have recently seen the line that is being pursued by the Shoreditch Borough Council—some information concerning which was given in our issue for May 17 and again last week. This is a scheme for supplying to tenements a small number of low illuminating power lights; and when the current is not being used for illumination purposes, it is diverted to the task of heating water for any modest requirement of the household—not for the larger purposes of baths or washing day, or for any extensive household work. The second case is Hackney. The Council of the borough have something very ambitious in view. At all events, it would appear to be so from a resolution that has lately been passed. An electrical exhibition has been held in the borough; and it is said to have been a great success. Having regard to that success, consideration is to be given to the desirability of electrical facilities being brought more easily within reach of the working and middle classes. Therefore, the Electricity Committee have had referred to them the duty of considering and reporting on the question of initiating a scheme whereby electricity for "all" domestic purposes may be made available to families of limited means without the necessity of "appreciable" initial expenditure. The Electrical Engineer is to prepare at once a report on the matter for submission to his Committee. The Committee and the Electrical Engineer have a big task there. The provision of electricity for "all" domestic purposes is not in itself a light thing; the making of electricity available for all families of "limited means" does not hold within it the prospect of profit; whether families of limited means will be able to pay for electricity for "all" domestic purposes is a matter already obsessed by grave doubt; and to make electricity available for all domestic purposes to families of limited means "without the necessity of appreciable initial expenditure," is asking the Electricity Committee and their Engineer to perform something in the nature of a miracle. The other instance is the Borough Council of St. Pancras. They are already doing business in a modest way in the supply of current to small dwellings. A report states that, at the present time, there are 285 consumers, and that Flaxman Terrace and Prospect Terrace Dwellings have

been wired for 488 lights; but the supply has been delayed pending a decision of the Special (Housing) Committee as to the wiring of the staircases, the caretaker's residence, &c., as the tubing for the rising mains can be utilized for both schemes. To prevent further delay, instructions have been given to proceed with the work immediately. Other electricity authorities have burnt their fingers over the business of trying to make profit out of electricity supply to small houses, and that at pre-war prices. We shall be interested to see what happens in the case of these three Metropolitan Borough Councils. Particularly instructive should be the report upon the Hackney reference.

Explanation Wanted.

A new electrically operated café has been opened in Cardiff by Mr. H. Wintle; and he advocates everything being done electrically in the home. He has tried it, and so he ought to know. But one gets a little bit suspicious when one reads in the "Western Mail" that Mr. Wintle asserts that "my biggest bill is £6 3s. per quarter, which included ten weeks' illness in the house, with an electric fire all day and night." The "Electrical Times" publishes this statement without any comment. Among other things Mr. Wintle hopes that the Cardiff Corporation will reduce the price of current for these purposes from 1¾d. to 1½d., and ultimately to 1d. per unit. Therefore, he is now paying 1¾d. per unit. Supposing his electric-fire is a 2-unit one, and this he kept burning ten weeks day and night. In twenty-four hours a 2-unit fire would consume 48 units; and 48 units at 1¾d. would be 7s. In seven days £2 9s. worth of current would be used; and in ten weeks £24 10s. worth. Assuming it was only a 1-unit fire, ten weeks' use day and night would run away with £12 5s. worth of current at 1¾d. per unit. There must be something wrong with Mr. Wintle's bill for £6 3s., or he has made a serious mistake about that fire which was running ten weeks day and night. The £6 3s. is for all the current consumed! There is something not quite clear here.

Some Questions.

"Meteor" of the "Electrical Times" comments upon a circular sent out by the Ogley Hay and Broomhills Gas Company, making a comparison of gas with electric lighting and power. We have not seen the circular; but judging from what "Meteor" says, it must be very vague and incomplete—if his statements correctly represent those in the circular. But even the critic may be criticized. We should like "Meteor" very much to give us more information upon certain questions that he puts in the course of his comment. The first one is: "Are these local gas people aware that even the leading gas-supply concerns of the kingdom now acknowledge that for lighting electricity has the advantage?" There is a very curious assertion underlying that question. We ask "Meteor" to be more explicit, and to inform us of the names of some of those "leading gas-supply concerns" which make the admission. We are pleased to say that until he answers that question, and until the gas concerns that he names admit the charge, we must decline to believe him. Then he asks: "Is it not common public knowledge that the few remaining small gas-engines are being replaced by electric-motors wherever possible?" We should be pleased if "Meteor" would answer that question himself. While he is doing so, perhaps he will be more precise about the word "few." As he feels himself justified in using the term "few," will he inform us as to the numerical evidence that he possesses to justify the expression. We also wonder if he can tell us why gas-engine manufacturers are able to pay decent dividends, and why it is, if gas-engines are not still being adopted, their output, instead of being on the wane, was showing (until the engineering trouble) a good expansion. A third question is: "Why do the engineers of large gas-works instal electric-motors on such a large scale for running their various processes." If "Meteor" cannot answer the question, then he ought to be downright ashamed of himself, for the explanation has been given frequently enough. They instal electric-motors because they are not so foolish as to discard something that is particularly suitable for their purpose; and they adopt gas-engines where the conditions for them are suitable, in order to gain economy. Gas engineers have always admitted that for certain uses electric-motors are without compare in respect of convenience; but for other purposes, the gas-engine is the economical power medium. The processes requiring motive power on a gas-works are scattered over a fairly considerable area; and the principal operation is in propelling along the floors of retort-houses the charging and discharging machines, and raising the charging and discharging members of the machines to the various levels of the tiers of retorts. In the workshops, for example, where there is a grouping of machine tools, which can be operated from shafting, there a gas-engine supplies the motive power more cheaply than would electric-motors. Perhaps "Meteor" will tell us why so many large gas-works have their own gas-driven electricity generating plant, instead of taking the energy from the town cables passing the works.

Co-operation between Gas and Electricity Works.

The General Manager of the Fife Power Company is Mr. J. S. Thomson; and he has been delivering an address to the Fife Mining and Engineering Students' Society on "Power Station Management." He dealt with many aspects of the question; but we are pleased to see that he is not one of those engineers who dismiss the idea of a larger co-operation in future between gas and electricity undertakings as something beyond the pale of practical politics. He says that it is possible that in future we shall see more co-operation between gas and electricity undertakings; and it is likely that in power stations some boilers will be fired with coal, others with coke or a mixture of coal and coke, and others with gas. Mr. Thomson proceeded to tell his audience that the Engineer of one of the big London power stations—curiously enough, the station Dr. Ferranti originally designed—is preparing a scheme for an extensive power station on ground adjoining and belonging to the largest gas undertaking in London. This, of course, is the Beckton scheme, to which reference has been made in the "JOURNAL" on previous occasions. The power station will be served by the Gas Company's existing railway and river wharfage accommodation, and will use a considerable quantity of coke breeze from the gas-works for boiler firing. This proposed arrangement is surely co-operation on the right lines; and who can tell but that in the near future the power station may find it economical to use not only the Gas Company's coke, but its gas also for boiler-firing. Mr. Thomson has more wisdom than those armchair critics who pooh-pooh these things as absurdities. There was a time when one journalist was fond of referring to the "inferior" fuel that gas undertakings wanted to foist on to the generating stations for boiler-firing. They are not shouting so loudly about "inferiority" since it has been found that coke used with coal has the effect of yielding a large economy, and of giving better efficiencies by improving the furnace fuel-beds, and by modifying the troubles to which smoke-producing coal gives rise in boilers.

Street Lighting Costs.

The interesting series of articles on "Modern Street-Lighting Equipments" has been continued in the "Electrical Times" since our last reference. In one of the articles, the author regrets the slow improvement of street lighting, and the development of electricity for the purpose. What has been done, it is urged, is not a sufficient improvement to arrest the attention of the man in the street; otherwise he would have asked for more. The writer seems to think that part of this is due to the inclination of local authorities not to spend more money, or to make only such improvement as can be effected by a similar expenditure as now. He proceeds to point out that the actual revenue derived from the sale of electrical energy is considerably less than the revenue (say) from the existing gas, which has probably been in use for a considerable number of years, and has become free, or practically so, from any sinking fund, and often interest, on the original capital expended. The newcomer is thus handicapped from the start as regards cost. But he asks would this not make less difference if the whole problem were approached and dealt with on a wider and bolder basis, with a fixed idea of improving the lighting, even if the cost has to be increased? Consider, for example, the large number of second-class streets now lighted with 50 to 100 c.p. lamps, spread at intervals of 50 to 75 yards. If these are electric lamps, the consumption is from 2000 to 4000 units per annum. The capital cost per lamp, including share of mains service, parts, and fitting, may be as much as £10, if the mains are already in the streets, or £20 if not, which at 10 p.ct. interest and sinking fund represents 20s. to 40s. a year. Allow for renewals of lamps 20s. per annum. Cleaning, lighting, and extinguishing also 20s.—making a total of 60s. to 80s. per annum. Taking an average rate of £5 per lamp, this would leave 20s. to 40s. for electrical energy. With a 60-watt lamp, the charge would be something between 1d. and 2d. per unit. If this annual expenditure was increased by (say) 25 p.ct. to £6 5s., a 100-watt lamp could be installed at the 2d. rate, or a 200-watt lamp at a rate a little over a penny. Thus for a 25 p.ct. increase in cost, an increase in light of 100 p.ct. and 400 p.ct. respectively would be obtained. As to arc lighting for main streets, the author says it is claimed that the best lamp is the modern flame arc, which gives 120 to 150 hours' burning with each trim of carbons. The figure quoted for the "Olipel" flame arc lamp is 8 candles per watt of useful light; illumination being given at a narrow angle from the horizontal—viz., 20°, which ensures good distribution. A lamp, therefore, burning with 10 ampères at 50 volts would have a total consumption, including line resistance losses—assuming, as is the usual practice, that the lamps are in series—of not more than 500 watts, from which would be obtained 4000 c.p. of light! As to cost, an approximate figure supplied by the Oliver Pell Control, Ltd., places the cost of carbons at approximately £4 5s. per lamp per annum at the present time, taking 4000 as the total burning hours. From the same source is quoted the following estimate of the cost per lamp per annum. Assuming a tariff of 1d. per unit, with 4000 hours burning:

	£	s.	d.
4000 hours × 500 watts at 1d. per unit	8	6	8
Thirty-four trims per annum, including labour of trimming at (say) 3s. per trim	5	2	0
Interest on capital and depreciation (say) . . .	2	12	0
Replacements, maintenance, &c.	1	0	0
Total	£17	0	8

We should like to know something more as to the measurement made to secure the 4000 c.p., or 8 candles per watt. It is also interesting to observe that, at 2d. per unit, the £8 6s. 8d. would become £16 13s. 4d.

"FIELD'S ANALYSIS."*

The Advent of the Heat-Unit Basis.

An advance copy of the latest edition of "Field's Analysis" has just been received from the Editor, and, as anticipated, the contents have been found extremely interesting.

We find that advantage has been taken of the introduction of the heat-unit basis of charge to re-arrange the work; and, though in outward appearance it remains the same, an attractive change is presented when we glance between the covers. The revision has not destroyed the character or continuity of the "Analysis" in any way, and, in our opinion, the alterations have increased its usefulness. A note has been inserted at the beginning of the book which tells us that results have been worked out upon the basis of the customary 1000 c.ft. of gas sold, and also upon the basis of the therm. Thus has the difficulty been overcome which at one time threatened to bring about a cleavage in the ranks of the students of the work. No doubt this happy solution has given the Editor and those beneath him responsible for the "Analysis" considerable trouble; but we are sure that the additional information will be greatly welcomed, and will amply repay Mr. Ibbs in the satisfaction which will be accorded the new edition in every quarter.

Another interesting fact gleaned from the above-mentioned note is that, wherever possible, the declared value of the gas has been used to arrive at the number of therms sold; the supplied figure having been used only when the declared figure was not available. This is contrary to what we imagined would be the course taken by Mr. Ibbs after his letters in the "JOURNAL" on the subject; but we understand that there were many practical difficulties in the way—not the least being the fact that it might not always be possible in the future to obtain the information required with regard to the actual calorific value of the gas supplied in the case of every undertaking. As a matter of fact, this difficulty has already occurred; and we find that the "Analysis" is incomplete in so far as the therm results of the Leicester Corporation figures are concerned. It is evident, therefore, that, apart from any other consideration, Mr. Ibbs is wise in adopting the declared figure, as this could always be definitely ascertained, and would not lead to a discussion—for instance, upon the merits or otherwise of selecting the Works' *v.* the Official Test of the calorific value of the gas, as might very well occur were it decided to make use of the supplied figure.

The therm results shown in this edition are on this occasion not as strictly comparative as they eventually will be. During a period of transition something of the sort is bound to happen; but when the differences—due to the use on the one hand of the supplied calorific value and on the other hand to the declared calorific value—are ascertained, there will probably be found very little in them.

Turning to the details shown in the "Analysis," to the special items of which we are now directed by an index, we find they appear in a sequential and logical order, and that certain figures, which experience has taught are no longer required or which would not serve a useful purpose, have been omitted. Not the least effective of the changes is the larger and clearer type used for the figures, as to the advantage of which no doubt will exist in the minds of those who study the work.

So much has been said and written on the therm that there is no need to go over the ground again; but it is impossible not to be startled by the change in view-point that follows a perusal of the results given side by side on the two bases. Many gas officials will find it very difficult for some little time to attune their minds to the therm basis, and will find it a hard struggle to break from the habit of considering results on the old basis; but when a more careful study is made of these figures, and when gas comes to be sold generally on the therm basis, there is no doubt that the 1000 c.ft. basis will gradually disappear.

As an example of the difference in result of the two bases, the following statement of cost of coal and oil, shown on the per 1000 c.ft. basis and also upon the therm basis in regard to the Metropolitan and Suburban Gas Companies, is extremely interesting. The Companies are placed first of all in order of merit on the per 1000 c.ft. basis, and then upon the therm basis. It is necessary to add that, with the exception of Richmond, the therm figures are worked out upon the calorific value declared by each Company, which, as before stated, may not provide such a strictly comparative basis as might be desired; the average calorific values actually supplied being naturally during this particular year not quite in accordance with the values declared for the purpose of the Gas Regulation Act. The table, however, sufficiently indicates the difference that is bound to exist between the two aspects, unless by chance every undertaking were not only to declare, but to supply, the same calorific quality of gas.

COST OF COAL AND OIL.

Order of Merit per 1000 C.Ft. and per Therm.

—	Per 1000 C.Ft.	—	Per Therm.	Calorific Value of Gas.
	d.		d.	
1. Lea Bridge	38·54	1. South Metropolitan.	7·804	550
2. Tottenham	39·92	2. Lea Bridge	8·564	450
3. Brentford	40·35	3. Gas Light.	8·618	475
4. Gas Light	40·93	4. Commercial	8·761	475
5. Hornsey	41·45	5. Brentford.	8·771	460
6. Commercial	41·62	6. Hornsey	8·818	470
7. South Suburban	42·87	7. Tottenham	8·871	450
8. South Metropolitan	42·92	8. Croydon	9·280	470
9. Croydon	43·62	9. South Suburban.	9·319	460
10. Wandsworth	45·63	10. Wandsworth.	9·708	470
11. Richmond.	53·34	11. Richmond	11·496	464

* "Field's Analysis of the Accounts of the Principal Gas Undertakings in England, Scotland, and Ireland for the Year 1921." Compiled by Herbert Edward Ibbs, Accountant to the Gas Light and Coke Company. London: Eden Fisher & Co., Ltd. Price £2 2s.

On turning to the residuals to see how they compare with the peak year of 1920, and taking the Metropolitan group of Companies as indicative of the industry in general, we find that the percentage of residuals on the cost of "Coal" is only just over 51, as against 81·63 for the preceding year, and against an average of 57·27 p.ct. for the six years to 1919:

	Cost of "Coal" per 1000 C Ft.	Residuals per 1000 C.Ft.	Per Cent. of Residuals on the Cost of "Coal."	
	d.	d.		
1914	15·39	8·68	56·40	57·27
1915	19·24	10 60	55·09	
1916	24·53	15·35	62 58	
1917	29·66	17·12	57·72	
1918	34·59	18·19	52·59	
1919	37 85	22·42	59·23	
1920	43·55	35·55	81·63	
1921	41 57	21·28	51·19	

With such a result, we instinctively turn to the net prices obtained from the three main groups of residuals, and find that the return per butt of liquor is only 5s. 9d.—about half the amount that was received the previous year, and far lower than any of the years quoted:

	Coke per Ton.	Tar and its Products per Gallon.	Liquor per Butt of 10 Oz.
	s. d.	d.	s. d.
1914	12 7·04	2·09	7 7·99
1915	16 9·90	2·39	8 3·98
1916	22 1 58	3·89	11 5·10
1917	24 5·64	3·92	10 11·69
1918	27 2·13	4·57	10 1·87
1919	37 4·58	3·91	10 4·49
1920	53 8·82	9·12	11 6·99
1921	39 5·81	4·02	5 8·96

The year 1921 was not only a bad one as regards the price obtained from residuals, but the demand for gas showed a falling-off. If figures relating to every fifth year, however, are taken out over the last 35 years, a consistently large increase is shown in every case, and the year 1921 is in this respect no exception. Fortunately the set-back is by comparison with the preceding year only, in which a very large demand for gas was experienced.

Gas Made by the Metropolitan and Suburban Companies.

Year.	Millions of Cubic Feet.		
1886	28,190		
1891	34,509	Increase	22·4
1896	38,603	,,	11·9
1901	45,548	,,	18·0
1906	50,198	,,	10·2
1911	56,139	,,	11·8
1916	62,369	,,	11·1
1921	70,646	,,	13·3

Year.	Millions of Cubic Feet.
1917	67,841
1918	62,932
1919	69,262
1920	73,095
1921	70,646

It is satisfactory to see dividends showing an improvement for the second year in succession; but even now they are, on the average, more than 18 p.ct. below those paid in 1914. The decrease in dividends paid grew larger and larger year by year from 1914 to 1919; the amount paid in the latter year being about 34 p.ct. below that paid in 1914.

	Dividends paid by the Metropolitan and Suburban Companies.	Percentage of Decrease Compared with 1914.
	£	
1914	1,872,257	—
1915	1,692,635	9·59
1916	1,691,657	9·65
1917	1,552,076	17·10
1918	1,269,274	32·21
1919	1,231,412	34·23
1920	1,336,848	28·60
1921	1,521,719	18·72

The effect of the war in the case of gas shareholders has been particularly hard. There has been no equality of sacrifice between employer and employed. The latter have had large increases in wages, to which shareholders offer no objection; but the gas investor, unlike investors in most industries, cannot look

forward to getting dividends in years of prosperity that will compensate for the loss sustained.

We hope that during the current year those who provided the capital, which enabled wages to be earned, will get at least their pre-war return. Is it too much to hope that the dividend will be large enough to make its purchasing power equal to the amount received pre-war?

Additional capital will undoubtedly be required and, unless present shareholders obtain a satisfactory return, companies will have to go outside that circle to attract capital, and a higher rate must be offered than would otherwise be necessary.

The "Analysis" is full of interesting and instructive facts, and will repay a close study. It should find a place in every Gas Manager's library and be within handy reach on all occasions for reference.

BOYS' RECORDING AND INTEGRATING GAS CALORIMETER.

Extract from a Patent Specification filed by the Board of Trade and Prof. C. V. Boys, F.R.S.

There was issued last Thursday by the Patent Office the complete specification of the recording and integrating calorimeter invented by Prof. Boys, F.R.S. The application was filed on Feb. 24, 1921, and the "complete" accepted on May 24 this year. The provisional and complete specifications cover more than nineteen printed pages, and are accompanied by seven sheets of lettered drawings. Pressure forbids our reproducing the specification *in extenso*, and accordingly we give the following general outline of the interconnected steps of the operation of the calorimeter.

The invention has for its general object to obtain a continuous record of the gross calorific power of gas in relation not to actual volume but to corrected volume—*i.e.*, to the volume that the gas would occupy if it were measured at some specified standard temperature and pressure and saturated with water vapour. In addition to the continuous record, an integrated value is given of the departure of the average value, since the instrument was last read or set, from some specified or declared value. All the operations of the instrument are effected positively and none inferentially, and with means comprised in the apparatus for verifying the measuring capacity of the instrument for gas volume, water quantity, and rise of temperature by direct reference to standard measuring vessels and thermometers which may have been examined, marked, and certified as correct.

The invention consists fundamentally in the design and construction of a piece of apparatus which will effect the object stated above, which the patentee believes is now done for the first time; and it consists also in the methods by which the several operations are accomplished and in the elements thereof. A special calorimeter of the flow type is employed, with a new series of interconnected operations, and new elements, as follows.

Water is constantly supplied at a rate greater than that which will be passed through the calorimeter proper (this being of the flow type), and is delivered into a measuring device which, when a certain desired quantity has been delivered, discharges it into a vessel, after which the stream is diverted into a second vessel. At equal intervals of time—for instance, every thirty seconds—the water again enters the measuring vessel; and the process is repeated all the time the instrument is in operation. By this means the first vessel receives the exact amount required for the action of the calorimeter, while the excess to be used for other operations in the instrument passes into the second vessel. An orifice is provided at the bottom of each vessel of such size that the water can escape as fast as it is received when a convenient depth of liquid is attained. The outflow of each vessel then, while subject to a moderate cyclic variation, is continuous and exactly equal in average amount to the water received. As will be seen, such short-period cyclic variation can produce no visible or harmful effect on the record; but even this is reduced by a special device to insignificant proportions.

The water from the first vessel passes next to the calorimeter proper, preferably through a long worm lining a containing tower within which the calorimeter is housed. Thereafter it passes through the calorimeter, and is then discharged. The calorimeter of the flow type is of simple construction, but has two novel features of special importance in a continuously working instrument. Much less gas than usual is advantageously burned in such an instrument, and so losses of heat due to imperfect jacketing would be proportionately more serious. By the use of a highly conducting shield, there is obtained the same effect as would be produced by a perfectly insulating jacket; and thus all heat loss is avoided, as will be explained below. The acid products of combustion have a corrosive and solvent action on the metal work through which they pass. Accordingly, this part of the calorimeter is made of very simple form and easily detachable and replaceable; and the calorimeter is easily removable from below without disturbing any other part of the combination. The replaceable part is of so simple a form that it may be made of lead with the joints autogenously soldered—thus much reducing the corrosive action and rendering replacement very seldom necessary.

The flow of gas to the calorimeter is both determined and measured by a wet meter of special construction having a differential connection between its drum and a clock-governed axle; and the water level in the meter is automatically caused to vary in such a manner that the volume of gas delivered by the meter at each revolution is the same, on the supposition that it is measured at standard temperature and pressure and saturated with water vapour. The particular differential connection preferred has freedom to turn on a screwed axle, so that if the axle and drum turn at the same rate there is no end-long movement; whereas if the rate is different, the measuring drum moves one way or the other according to the direction of the relative movement. This longitudinal movement serves to operate a control for the gas inlet, reducing it when the drum is rotating faster than the axle and *vice versâ*. The gas supply is thus maintained at the desired rate (if measured under standard conditions), and the governor usually required to overcome the inequalities of the meter may be dispensed with, because the friction of the meter axle is not only free from that due to a stuffing-box, but does not have to be overcome by the pressure of the gas.

The axle of the meter is conveniently connected directly to the escapement wheel of a pendulum clock driven by a water-wheel operated by the waste water from the second vessel aforesaid. By this means both the counting train of the meter and the driving train of the clock are dispensed with; the need for winding being thus removed, and the clock operated by a constant torque and under ideal conditions if the waste water is sufficient to fill the buckets of the water-wheel—the excess running off.

The water level in the meter is caused to vary by raising or lowering an adjustable outlet orifice, while a very small quantity is derived as by a wick controlling a duct fed from the water-wheel supply or by a cup, bucket, or syphon having a capillary outlet tube to provide for leakage at the meter axle or elsewhere or for evaporation. The raising or lowering of the outlet orifice is effected conveniently by connecting it to a balance beam or lever, one end of which is moved by the action of a small inverted air-vessel dipping in and closed by mercury on which floats a small quantity of water. The volume of the saturated air will vary in the same manner under conditions of temperature and pressure as that of the gas in the meter drum; and the connection of the air vessel to the outlet orifice is such that the volume of the gas space in the meter drum is maintained in constant proportion to that of the air in the air vessel. By this means a constant supply of gas as measured under standard conditions is provided for combustion in the calorimeter, and this may be set for any standard rate—such, for instance, as half a cubic foot per hour. The clock itself indicates not only the time but the gas supply, and drives the drum carrying the recording paper and the drum of the integrator. So long then as gas and water are supplied and so long as the paper supply for the drum is sufficient, the instrument will work indefinitely without requiring attention for winding or setting.

It will be evident that with gas of any particular calorific power the rise of temperature of the water in its passage through the calorimeter will depend on the relative volumes of gas (corrected) and water allowed to pass; and each of these is independently governed by the clock, but may be made such as will give a convenient temperature rise. Conversely, where the calorimeter is to be used for ascertaining if gas is of some particular declared value (and if not by how much it departs therefrom), the water measuring vessel may be given such capacity that if the calorific power of the gas has the declared value then a particular rise of temperature—for instance, 10° or 20° C. (or 18° or 36° Fahr.)—will take place in the calorimeter. For such purpose it is convenient that the measuring capacity should be adaptable to the declared value. With such an arrangement the same recording means and the same rise of temperature are suitable without alteration for any declared value; and the departures therefrom will be proportions of the whole conveniently shown on the recording sheet as percentage departures thereform (*plus* or *minus* as the case may be). Where, however, it is intended that a record of calorific value of gas, irrespective of any declared value but in direct terms, should be given, then it is more convenient to choose a size for the water measuring vessel which will give rise to an elevation of temperature such that the number of degrees rise is an aliquot part of the figure expressing the calorific value. For example, if with gas of a calorific value of 540 B.Th.U. per c.ft. (corrected) a rise of temperature of 27° Fahr. is produced, then the ratio would be 20; and whatever the calorific value may be, the recorded value on the paper's scale would always be 20 multiplied by the rise of temperature as shown by the two thermometers—an arrangement which greatly facilitates the testing of the whole apparatus. These two examples are given to show how the invention is available for two usual types of use and the same record paper adaptable for either as required.

In order to cause a pen to move over the paper, use is made of relatively large operative thermometers filled with a liquid having a high "a" coefficient of expansion but a relatively low "b" coefficient when the volume is expressed by an equation of the usual type: $V^t = V^o (1 + at + bt^2)$. It has been found that amyl alcohol is a suitable liquid, and it has shown no sign of corrosive action on the metal by which it is contained. One bulb is in the inlet water compartment of the calorimeter casing, and the other bulb in the outlet compartment; each bulb being connected with a variable capacity indicator, such as a group of aneroid diaphragms the movements of which, owing to expansion or contrac-

tion of the liquid, are a measure of the changes of temperature. Owing to the use of bulbs of large size, a sufficient expansion is obtained; and owing to the expansion being that of a liquid and not of a gas, the movement is one of insistence and not a mere elastic or persuasive push, which is all that can be obtained from a gaseous content. The two thermometers are so mutually proportioned as to give slightly different linear movements for the same change of temperature. It is preferable to make the bulb of the inlet or cold-water thermometer of greater capacity than that of the hot-water thermometer in the ratio of 10:9; and the aneroid devices have equal diameters, so that the linear movements are in the ratio 10:9 for the same change of temperature in each. The first magnifying lever is also made to magnify the movement of the hot-water thermometer 10 times and of the cold water in the opposite direction 9 times. Other proportions might, of course, be chosen, provided the lever magnification and thermometer relative movements correspond. By this means variations of temperature of the inlet water are compensated; for as this affects the temperature of the two thermometers equally, the far end of the first lever is not moved thereby, but only by difference of temperature. The far end is connected by a link with the short arm of the pen lever. The pen is at the end of the long arm, and writes directly on the travelling paper. The length of the short arm is adjustable so as to make the scale of magnification correct. The length of one of the connections between the aneroid boxes and the thermometer lever is adjustable, so that the pen may be set to the correct division on the paper to correspond (as already explained) with the observed difference of temperature of two standard thermometers in the inlet and outlet water of the calorimeter respectively. In order that the scale of magnification may be ample enough with a conveniently narrow band of paper, only a moderate part of the scale of calorific value, or only a moderate departure from the declared value (for instance, in the latter case − 20 p.ct. to + 20 p.ct.) is provided on the paper, or so much of a complete scale as is ever likely to be required. It is arranged that when the calorimeter is not in use, or when the two thermometers differ in temperature by an amount which would move the pen off the paper at the low-value end, the connection between the aneroid box and the thermometer lever merely goes out of engagement and the pen lever is not driven past a limiting stop; and a slight torque is applied to the axis of the pen lever tending to move the pen towards the low-value end of the record.

In the rocking axis of the pen lever is provided an integrator of the Amsler type, to integrate with respect to time the departure of the pen from its middle position; a cross axle driven by a worm on the clock axle driving an operative drum at the rate of one turn per day. The integrating wheel is equal in diameter to the drum, and the pen lever is made 100 times as long as a 1 p.ct. departure from the declared value on the paper scale. With such proportions, at the end of any period since it was last set, a reading taken on the integrating wheel is interpreted as follows: This being divided into 100 parts, each division on the *plus* or *minus* side corresponds to an integrated value equal to that which would be produced by one day's excess or defect of 1 p.ct. as the case may be. Of course, other proportions may be used. If the record is one of actual calorific value and the pen lever is 100 times as long as the movement corresponding to one unit, then the integrated result is interpreted as follows: If the record is zero, then the average value of the gas is that of the division marked by the pen when in its middle position. If the reading is, for instance, + 5, it means that the excess over the value, indicated by the middle position of the pen, is that which would be produced if the gas had the middle position value all the time except for five days when the excess was 1 unit, or for one day when the excess was 5 units; and similarly for other proportions, as will be understood by those conversant with integrators. The integrating wheel is carried in a lantern in the pen axis, and the weight of the whole is carried on the operative drum. Where the friction or wear due to such pressure is more than is desirable, the weight of the pen lever axis and lantern is in part counterbalanced, and the same thread which is used for giving a torque to the axis may be used to counterbalance it in part by giving it an inclined and eccentric pull.

The same cross shaft which drives the integrator drum also drives the drum carrying the record paper. This cross shaft, ending in the front of the instrument, is made to turn in the counter-clockwise direction once in half-an-hour, and all three worms are right-hand screws. The front end of this shaft turns wheels one at one turn an hour and the other at one turn in twelve hours in the clock direction, and hands moved by these show the time on a clock face on the front of the calorimeter tower.

All the parts of the combination are carried on shelves or brackets round the calorimeter tower, and thus form a compact and organic whole rather than a series of separate and semi-independent instruments.

If when left unattended the water supply should be cut off, the calorimeter has the advantage that the clock will immediately lose its motive power and stop, and the meter drum will run on the screw and shut off the gas; thus preventing automatically overheating of the calorimeter, with possible destruction of some of its parts. If the water supply is resumed, the bucket will tip over and be caught by the detent; but the clock will not start and no more gas will flow. The time of the stoppage will remain recorded on the chart.

If, during the unattended operation of the instrument, the gas should be cut off, the flame would go out and the meter drum, not being driven, would be screwed in such a direction as to open the gas-way until it reached the limit of its movement, when the clock would be stopped. If thereafter the gas should be turned on again, the meter would turn so far as to screw the drum to the other extreme and cut off the gas now not burning automatically. If the clock were a pendulum clock, it would not start again; but if a balance-wheel clock it might do so, and in that case the gas, having gone out, would again pass at the proper rate and, not being burned, would escape. This is the reason for preferring a pendulum clock.

If for any reason the clock should stop, the gas-meter drum would move on its screw, closing the gas constriction and putting out the flame, while the calorimeter would be deprived of water.

From these considerations it will be seen that the combination of elements is such that, in the event of such accidents as might occur, neither is the calorimeter a source of danger to the building in which it is placed, nor is there any necessity to provide special safety devices operated by extremes of temperature or otherwise which, besides being additional complications, are liable to fail from want of use.

This general description of the principles of working is followed by a lengthy detailed explanation in reference to twenty illustrations of the instrument and its component parts. These are to a certain extent elaborated in the claims as given in the "Register of Patents" in this issue of the "JOURNAL," where the usual notice is published for record purposes. We are unable through current pressure to reproduce any of the illustrations; and it is thought that anyone sufficiently concerned with the subject will prefer to purchase the full specification. The serial number is 180,080, and it is obtainable for the regular charge of 1s. at the Patent Office, No. 25, Southampton Buildings, W.C. 2.

GAS REFEREES AND CONTINUOUS RECORDING CALORIMETERS.

First Official Prescription for Their Use.

In connection with the Brentford Gas (Charges) Order, 1921, the Gas Referees (Prof. C. V. Boys, Mr. W. J. A. Butterfield, and Dr. J. S. Haldane) have just issued a Special Provisional Prescription, under the Gas Regulation Act, 1920, which is the first to deal with the use of continuous recording calorimeters.

The prescription, which is dated June 14, 1922, sets forth that the Brentford Gas Company have given notice in the "London Gazette" dated April 1, 1921, that they intend to supply gas of a calorific value of 460 B.Th.U. (gross) per cubic foot as from the 1st of April, 1921, and are required by the provisions of the Act to supply gas which, when tested in accordance with the provisions of the Act, and the Prescription of the Gas Referees, shall be:

(1) Until further notice, of an average calorific value for each quarter of not less than 460 B.Th.U.
(2) Until further notice, of a calorific value not more than 6 p.ct. below 460 B.Th.U. on any day—a "complete 1 p.ct. by which the calorific value is deficient in excess of 5 p.ct." Gas Regulation Act, section 9 (1) (3).
(3) Free from any trace of sulphuretted hydrogen.
(4) At not less than 2 in. (of water) pressure.

PRESCRIBED TESTING-PLACES.

The places at which testings of calorific value, of pressure, and of purity in respect of freedom from sulphuretted hydrogen shall be made are situated (*a*) at the gas-works, Brentford; (*b*) at the Gas Company's governor-house, Southall; and (*c*) at the gas-works, Staines—being testing-places provided in pursuance of the Brentford Gas Act.

The Gas Referees prescribe that these three testing-places shall be testing-places prescribed by them under section 5 (1) (*a*) of the Act, at which tests shall be made to ascertain whether the Gas Company are supplying gas in accordance with their obligations. The testing-places shall in every respect, together with the apparatus, record sheets, &c., prescribed herein, and all facilities for testing, be provided and maintained by the Gas Company to the satisfaction of the Gas Referees. The testing apparatus at the prescribed testing-places at Brentford and Southall shall be placed by the Company in a room or partitioned space to which the Gas Examiner or Examiners only shall have the means of access. The Gas Company shall at all times immediately give free access to the testing-places to Gas Examiners jointly or separately appointed under the Gas Regulation Act, 1920, to test the gas supplied by the Company.

[Particulars as to what the Company shall do in this respect are then set out.]

DUTIES OF GAS EXAMINERS AND TIMES OF TESTING.

The testings shall be made and the continuous records verified by a Gas Examiner appointed jointly by the several Local Authorities, or by Quarter Sessions, or by the appropriate County Council (by consent) for the districts of the consenting Local Authorities in that County; but in the event of separate Gas Examiners being appointed, the arrangements shall be in the hands of the Gas Examiner as named below.

[Then follow full details of the duties of the Gas Examiners, and the times of and arrangements for testing.]

If the Gas Company so desire, their representative may be present on any occasion when the Gas Examiner inspects or alters, adjusts, or replaces the testing apparatus, or tests the gas. The Gas Examiner shall, therefore, give reasonable notice to the Gas Company of the time at which he will attend at the Southall testing-place; at Brentford and at Staines he shall, immediately on entering the premises, inform the gatekeeper or other servant of the Gas Company that he is visiting the prescribed testing-place.

APPARATUS TO BE USED.

The apparatus to be used at each of the testing-places at Brentford and Southall shall include a calorimeter for the production of a continuous record of the calorific value of the gas supplied. This calorimeter shall, for the present, be that already provided in each testing-place as hereinafter provisionally prescribed by the Gas Referees.

At the prescribed testing-places at Southall and Staines there shall, for the present, be used the two Boys non-recording calorimeters already provided by the Gas Company; that at Southall being additional to the recording calorimeter. In verifying the records of the recording calorimeters and making testings with the Boys non-recording calorimeters, the instruments shall be used in each case in conjunction with thermometers for which certificates have been issued by the Gas Referees, and a water-measuring vessel and a meter-proving measure, which have their mark of certification; and the Gas Examiner shall verify on each occasion that the apparatus is so certified.

The apparatus and mode of testing for sulphuretted hydrogen at the prescribed testing-places shall, for the present, be in accordance with the regulations prescribed in Parts I. and II. of Schedule "A" of the Gas-Works Clauses Act, 1871.

The apparatus for testings of pressure at the prescribed testing-places, and as specified below, shall, for the present, be U-tube pressure-gauges containing water, of which the scale extends to the highest pressure at which gas is supplied to the ordinary consumers of the Gas Company. Additional testings of pressure may be made if required, at places other than the testing-places prescribed as aforesaid, in accordance with regulations which will be prescribed by the Gas Referees in their General Notification shortly to be issued.

The Gas Examiner shall inform the Gas Referees at once if at any time he has any reason to suspect that the results of his testings are not trustworthy on account of any defect in the testing apparatus or otherwise.

RECORDING CALORIMETRY.

The calorimeter to be used in producing continuous records and in verifying the same at the Brentford and Southall testing-places shall, for the present, be the Fairweather recording calorimeter, which is hereby provisionally prescribed for use in these two testing-places.

A description of this instrument prepared by its makers—Messrs. Scientific and Projections, Ltd., Crawford Passage, Farringdon Road, London, E.C. 1—is given in an appendix*, in order that the Gas Examiner may understand its construction and method of operation. The instructions, also provided by its makers, for the setting-up and working of the instrument are given; and these instructions shall be followed by the Gas Examiner as hereafter prescribed.

The instrument shall have been set-up beforehand by the Gas Company with all necessary assistance from the makers, so that it shall be handed over to the Gas Company on July 1, 1922, in satisfactory running order. The Gas Examiner shall satisfy himself by reference to the instructions for setting-up the instrument given in the appendix that it is in satisfactory running order, and shall thereafter by reference to those instructions make any necessary small adjustments to maintain it in satisfactory running order. In the event of extensive adjustments or repairs becoming necessary, he shall inform the Gas Referees and the Gas Company; and the Gas Company shall provide the necessary assistance through the makers of the instrument or otherwise.

On the occasion of making the first verifying test in each week at Brentford and at Southall, the verifying Gas Examiner shall give attention to the Fairweather calorimeter as follows:

(1) See that the gas supply governor delivers gas to the meter at a steady pressure of about 3 to 3½ in.
(2) Correct the level of the water in the meter after observing the mark upon the water-box, test the connections for soundness, and note the fact in the record book. On the occasion of the first verifying test in each quarter, the meter shall be proved by means of the meter-proving measure, and the mark on the water-box shall be verified.
(3) Verify timing of meter by means of an accurate stop-watch or clock.
(4) Verify water flows running into the common sink under the table to ascertain whether water is flowing correctly from the various vessels in use (overflow from air vessel, meter jacket, and calorimeter).
(5) Make the verification tests, supplemental tests, and adjustments, described under the headings "tabular gauge," "water flow," and "recorder" in the appendix.
(6) Fill the pen with ink, wind and set the clock, and if necessary adjust the pendulum of clock and record sheet drive. Write the time and date of starting on the newly-fixed record sheet, if necessary adjusting the pen to the B.Th.U. value ascertained by the verifying test.
(7) Keep a complete record of all tests, and adjustments of the instrument in the record book.

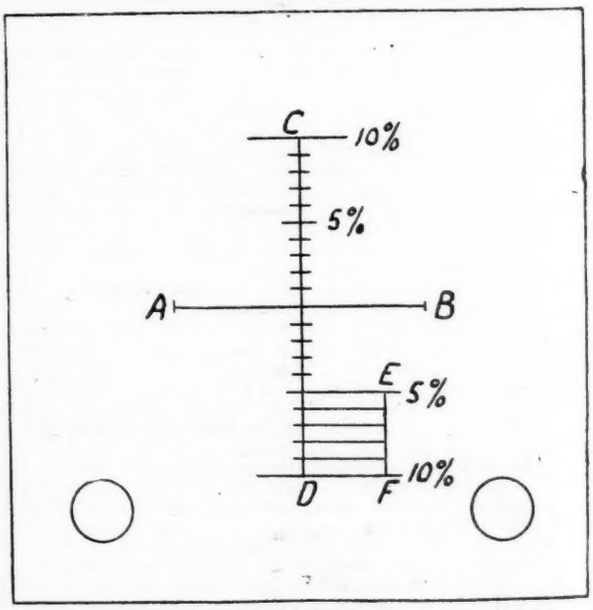
One testing for the purpose of verifying the record shown upon the record sheet shall be made at each of these two testing-places on each of two days in each calendar week; but the intervals between two consecutive testings shall be not less than two or more than five days.

On these occasions the Gas Examiner shall make a verifying test in which he observes the flow of gas and of water, and by means of mercurial thermometers observes the rise of temperature of the water, and so determines the calorific value of the gas at the time as described in the directions given in the appendix. He shall also, following these directions, obtain a continuous record of the calorific value of the gas; and on every occasion on which he makes a verifying test, he shall mark on the record sheet in ink a dot within a circle at the spot on the sheet corresponding to the calorific value thus determined, and the time of the observation, and write his initials near the circle. When, if ever, the discrepancy amounts to as much as 2 p.ct., he shall reset the pen to agree with the value determined in the verifying test, and write "pen reset" on the record sheet.

The record sheet of the calorimeter is ruled with two sets of lines, one a series of curved lines across the sheet spaced at intervals of ¼ in. These each represent a period of one hour, and the curve is drawn to the same radius as that followed by the pen in its sweep over the sheet. The other set of lines parallel to the edges of the sheet are spaced $\frac{1}{10}$ in. apart, with the fifth and tenth lines more conspicuous. The middle line shows the position of the pen when the gas has its declared calorific value, whatever that value may be. Each $\frac{1}{10}$ in. movement of the pen represents a change of 1 p.ct. in the calorific value of the gas, to the left of the middle line when in excess of the declared value, and to the right when below the declared value.

The calorimeter is provided with two adjustments for the pen system, one to set the pen so that the record agrees with the verifying test, and the other to adjust the degree of magnification of motion so that 1 in. represents a change of 2 p.ct. whatever the declared value may be. With such a system of record, all record sheets from different districts and with different declared calorific values become directly comparable; and the record for a week, 42 in. in length, is not inconveniently long. If there is a deficiency of 5 p.ct. for only two hours, a square half-an-inch in the side can just be included between the curve on the sheet and the middle line. The method of obtaining the average value and of ascertaining if any deficiency of calorific value is greater than the permissible deficiency will be found further on.

In order to ascertain the calorific value of the gas for each day of the week, he shall detach a week's record (Saturday midnight to Saturday midnight), after making the first verifying test of the following week. Should the discrepancy (if any) between the record and either of the verifying tests amount to 2 p.ct. or less, the record shall be used, subject to correction as described below, for finding the value day by day in the interval. For this purpose a transparent celluloid scale [in the form that is shown below]



Celluloid Scale.

shall be laid over the record for each period of six hours, in such manner that the areas enclosed by the straight line A B on the celluloid scale and the curve on the record sheet above and below this straight line, shall be, as far as the eye can judge, equal to

* The Fairweather calorimeter was described in the "JOURNAL" for June 15, 1921, p. 628 and Oct. 19, 1921, p. 200.—ED. "G.J."

one another. The reading to the first place of decimals on the transverse scale C D on the celluloid where it is crossed by the middle line of the record is then the average calorific value for that period of six hours, and the mean of the four readings for any day is the average value for the day expressed as so much per cent. above or below the declared calorific value.

In taking these readings, the Gas Examiner shall make two corrections if necessary: (1) That described by the makers of the instrument under the heading "Verification Tests—Recorder," in the appendix, for correcting the effect of any small accidental displacement of the paper. This is shown by the dotted pricked line, which is the true line, being to one side of the middle printed line of the record sheet. (2) A correction for the mean of the discrepancies (if any) at the beginning and end of each interval, between the values directly observed and those recorded on the sheet. If the test is made before noon, the previous interval shall be deemed to terminate at the preceding midnight, and if after noon at the following midnight.

The Gas Examiner shall also examine the record sheet for low values; and if at any place the record is 5 p.ct. or more below the declared value, he shall apply the transparent celluloid sheet to the record so that its middle line A B lies along the middle line of the sheet, and sliding it along in this position see if any of the short lines on the celluloid terminated by the lines C D and E F, and marked 5 p.ct. or one representing a larger deficiency, and which in length corresponds to a period of two hours, can be included within the record line.

He shall read this deficiency to the first place of decimals, and, after making the two corrections described above, he shall report the result as a deficiency in value to a corresponding extent for a period of two hours. On any occasion on which the Gas Examiner finds a deficiency of as much as 5 p.ct. for two hours or more, he shall immediately inform the Gas Referees.

The exposed portion of the current record is at all times to be left visible for observation by the staff of the Gas Company. If at any time the Gas Company should observe a recorded deficiency of 5 p.ct. or more which is not in substantial agreement with tests made by them with a separate certified calorimeter, they shall, as soon as they conveniently can, inform the Gas Examiner of the discrepancy, so that he may make a verifying test as soon as possible to ascertain whether the instrument is recording correctly.

If in the interval between two consecutive verifying tests the deviation of the recorded calorific value from the value directly observed by the Gas Examiner should have changed by more than 2 p.ct., then the record for the whole of the interval between the two tests shall be cancelled, and the mean of the calorific values observed directly in these verifying tests shall be deemed to be the average calorific value of the gas for each day in the interval.

For the purpose of the written record, and of ascertaining the calorific value and the quarterly average of the calorific value of the gas supplied, the Gas Examiner shall verify the record as before mentioned, and after detaching the week's record sheet shall turn the sheet horizontally and insert in ink on the upper portion of the sheet—that is, the portion whose lines represent percentages higher than the declared calorific value—on the lines representing 3 a.m., 9 a.m., 3 p.m., 9 p.m. of each day (*i.e.*, the mid-hour of each six-hour period), as follows:

(*a*) The average calorific value expressed as so much per cent. above or below the declared calorific value for the six hours, as shown on the sheet, and as determined by the application by him of the celluloid scale.

(*b*) The correcting figures (1) and (2) obtained as prescribed, used as *plus* or *minus* percentages, as the case may be.

(*c*) The final sum or difference.

(*d*) This final result shall be the calorific value for the six hours as represented, and shall be an item together with the three other items similarly ascertained and inserted for the day. The sum of these four calorific values for each day, divided by four, shall be the calorific value of the gas supplied for the day ascertained in accordance with the Gas Regulation Act and in the manner prescribed by the Gas Referees, and this figure shall be written conspicuously on the 12 o'clock noon line in the upper part of the sheet, and entered in the record book.

For the purpose of the written record and of ascertaining the deficiency (if any) of the calorific value of the gas supplied during any continuous period of two hours and upwards, the Gas Examiner, after verifying the records and detaching the week's record sheet as before prescribed, shall insert in ink in the lower portion of the chart—that is, the portion of the sheet whose lines represent percentages lower than the declared calorific value—below any recorded deficiency of 6 p.ct. or more for two hours and over as follows:

(*e*) From hours mins.
To hours mins.

(*f*) The calorific value expressed as so much per cent. below the declared value for the above period of time as shown on the sheet and as determined by the application by him of the celluloid scale in the manner already described.

(*g*) The correcting figures (1) and (2) obtained as prescribed, used as *plus* or *minus* percentages, as the case may be.

(*h*) The final sum or difference.

(*i*) The Gas Examiner's signature.

The final result shall be the percentage deficiency in calorific value for the period of two hours or more written above, and shall be the percentage below the declared calorific value of the gas supplied by the undertakers for a period of two hours or upwards ascertained in accordance with the Gas Regulation Act and in the manner prescribed by the Gas Referees. This result shall be entered in the record book.

Non-Recording Calorimetry.

The Boys non-recording calorimeters at Southall and at Staines shall be used generally as described in the Notification of the Metropolitan Gas Referees for the year 1912; but the period during which the calorimeter burners shall remain alight before the Gas Examiner makes his observations shall be 45 minutes, instead of 30 minutes. A copy of the said Notification shall be provided by the Gas Company in each testing-place.

At Southall, the meter used with the Boys non-recording calorimeter shall be proved by means of the meter-proving measure, and the mark on the water-box verified on the occasion of the first test in each quarter. If after four complete turns the meter-hand reads as much as one whole division in excess or defect of the point from which it started, the Gas Examiner shall adjust the water-level in the meter and repeat the operation until the reading is within these limits. The level of the water in the meter shall be corrected after observation of the mark on the water-box before each testing; and the connections shall be tested for soundness by the Gas Examiner once in seven days upon which testings have been made.

At Staines, the Gas Examiner shall prove the meter by means of the meter-proving measure and test the connections for soundness on each occasion before making a testing for calorific value.

In the event of a testing of calorific value made by means of either of the two Boys non-recording calorimeters giving a result which is more than 5 p.ct. below the declared calorific value, the Gas Examiner making the testing shall prove the meter and test the connections for soundness before he makes the supplementary testing which has to be made after an interval of not less than one hour, in accordance with Section 9 (1) of the Gas Regulation Act, 1920.

Reports.

[Instructions follow as to the making of reports.]

The average calorific value of the gas supplied by the Gas Company during any quarter will, for the present, be ascertained by the Gas Referees by taking the sum of the calorific values of the gas for each day, as determined at each testing-place at which official testings have been made, and dividing by the number of daily calorific values during the quarter; and the quotient shall be the average calorific value in the districts for which Gas Examiners have been appointed. This average will be ascertained and certified by the Gas Referees from the results reported to them by all the Gas Examiners.

The Gas Referees for the present will issue, not later than one month after the end of each quarter, a quarterly certificate of the results of all official testings made at the testing-places or elsewhere of the gas supplied by the Gas Company. The Gas Referees will forward this certificate to the Local Authorities or Quarter Sessions by whom the Gas Examiners have been appointed, and to the Gas Company.

The Gas Company shall notify the Gas Referees within seven days after the end of the quarter of any reports of the Gas Examiner made during the quarter in respect of which they have appealed to the Chief Gas Examiner. In the event of the Gas Referees having been thus notified, they will defer issuing the certificate for the quarter until the Chief Gas Examiner has informed the parties of the result of the hearing of the appeal. They will then prepare and issue their certificate for the quarter, amending or annulling, according to the decision of the Chief Gas Examiner, the report of any testing in respect of which an appeal has been made.

Publication of Results.

The Gas Company shall cause the quarterly certificates to be made available for the use of the public by exhibiting a copy at each of their offices and showrooms, and shall either furnish each collector with a copy to be produced to any consumer on demand or, alternatively, shall forward a copy to any consumer at his request.

The Company shall further cause to be printed on each consumer's gas account the following statement:

Gas Regulation Act, 1920.—The Gas Referees prescribe that the results of the tests made by each officially appointed Gas Examiner shall be made available to the public in the following manner: A copy of the certificate of the Gas Referees for the preceding quarter, as forwarded to each Local Authority by whom a Gas Examiner is appointed, shall be exhibited by the Company in each of the Company's offices and showrooms, and shall either be carried by each of the Company's collectors for production to any consumer on demand, or, alternatively, shall be forwarded by the Company to any consumer at his request.

The Gas Company shall furnish the Gas Referees and the Gas Examiner with a copy of any published notice of alteration in the declared calorific value within fourteen days of its appearance in the "London Gazette;" and unless the Gas Referees shall notify otherwise, this prescription shall remain in force and shall be read and construed as from the date specified in the notice of declaration as if the calorific value declared in the notice were substituted for the previously declared value.

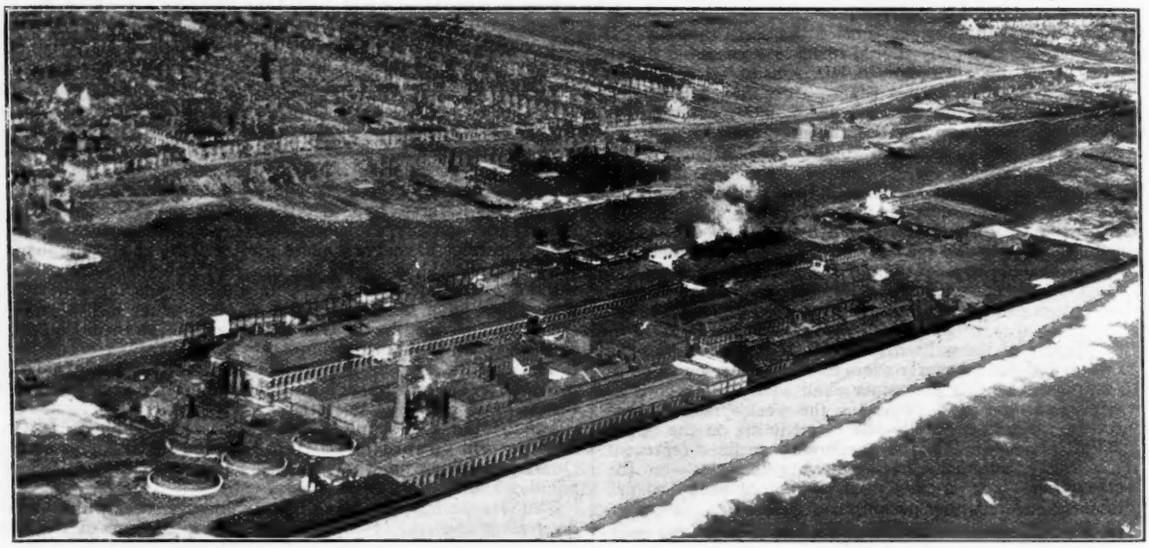
This Prescription shall come into force on July 1, 1922.

LONDON AND SOUTHERN DISTRICT JUNIOR GAS ASSOCIATION.

Visit to Brighton.

In extending a hearty welcome to Brighton last Saturday to a very large party of visitors, Mr. A. M. Paddon, the Chairman of the Brighton and Hove General Gas Company, expressed the hope that nothing might occur during the day to mar their pleasure. This hope was absolutely fulfilled; for with excellent arrangements and perfect seaside weather the time was thoroughly enjoyable in every way. The occasion was the summer meeting of the London and Southern District Junior Gas Association; and the party thus welcomed numbered close upon two hundred members and ladies, together with some thirty other guests. The members of the Association were headed by the President (Mr. F. A. Frost), the Senior Vice-President (Mr. D. C. Cross), and the Hon. Secretary (Mr. George Winslow); and the presence during the day of many seniors in the profession was a great gratification to them.

Some arrived by rail and others by road; the former being met at the station by motor coaches, and taken for a drive round the town, to the Royal Pavilion, which was the meeting-place. Here the visitors were met by Mr. Paddon, Mr. J. M. Miles (a Director), Mr. C. H. Rutter (the Engineer and General Manager), Mr. E. L. Burton (the Secretary), and Mr. Joseph Cash (the late Engineer). Others present included Mr. W. H. Bennett, Mr. C. F. Botley, Mr. J. W. Buckley, Mr. A. Caddick, Col. Clarke, Mr. F. W. Cross, Mr. W. H. Hammond, Mr. L. J. Langford, Mr. L. Trewby, and Mr. E. L. Widdowson. Subsequently, in the handsome banqueting room, the large party were the guests of the Company at lunch—with Mr. Paddon in the chair.



[*Photo. by the Central Aerophoto Co. Ltd.*

AN AERIAL PHOTOGRAPH OF THE PORTSLADE WORKS.

The Proper Spirit.

Having given in this way a much appreciated practical demonstration of the "proper spirit," Mr. Paddon, after the honouring of the "Loyal Toast," proceeded to further emphasize his views on a subject which is of vital importance at the present time; and with what he had to say his hearers expressed their cordial agreement. After declaring how pleased he and his colleagues and the Company generally were to have the privilege of seeing the Association there that day, and how sincerely they hoped the occasion might be one of pleasure and some little degree of interest, he said that there was to be an inspection of the works later on; and he would ask the members to be a little kindly in their criticism, because things there were really in a state of transition, and processes on which they were dependent three years ago were no longer in existence. They had been wiped away, and other methods substituted. It would therefore be clearly recognized that there was much yet to be accomplished in developing what they would regard as their full technical efficiency. The visitors would find something rather exceptional in the position of the works and the adaptation of things to the needs of the case; for coal was at the present moment being carbonized on a spot where he himself remembered the existence of over 3 fathoms of tidal water. This would show that they had a clear objective in the design of the works, and that there had been some persistence in attaining to it. He did not know whether the visitors would find time to interest themselves in the Company's distributing methods; but this was a matter which should always appeal to gas engineers. It used to be said that money was made in the retort-house. Perhaps it was; but after all it was no use drawing a cheque on the works which one could not cash on the district. The distributing engineer in the old days—the man who sold the gas—had a less important position than he occupied to-day. Now it was realized that his position was one of paramount importance. He had a high public duty to fulfil, and as a rule got singularly little thanks for doing it. He had to understand the psychology of people who wanted to buy his commodity; and he had also to sell it to them if they did not want to buy it—which in itself was no inconsiderable thing to accomplish. They had been reconstructing their distributing system in Brighton; and he hoped with good results. Mr. P. E. Browne (their distinguished Distributing Engineer) had very little to learn in this respect.

Proceeding to the "proper spirit" portion of his remarks, Mr. Paddon said they were all of them engaged in overcoming difficulties of one kind or another; but every other problem they had had to face had been insignificant compared with that of dealing with labour, and nothing distressed them so much to-day as the industrial position. "We cannot," Mr. Paddon continued, "go on as in the past. We must establish a new relationship between ourselves and our labour; and you will never do that by shibboleths, catchwords, or formulæ. You will only do it by hard work. Co-partnership is as hard to grow as orchids; but it is more beautiful than orchids when it has grown. So many people think that just in the mere utterance of that phrase they have disposed of their difficulties. They have not. You must put your whole hearts into it; and then you will reap reward out of all measure from your efforts. But you must work at it—that is the point. Unless you can win the confidence and affection of those you have to work with, you may as well give up your job, for you will never succeed. I believe that at least three-fourths of the difficulties of the past have been due to the fact that we have not made men like us and trust us; and we must do it in the future. That is the keynote of co-partnership; and it is what you have to do. It is difficult; but so is everything that is worth doing and having."

When the applause with which Mr. Paddon's remarks were greeted had subsided, Mr. Frost expressed the thanks of the Association to all those connected with the Company for the cordial and hospitable manner in which they had been received. They were gratified by the presence of so many seniors, and particularly that Mr. Paddon should be with them. He thought this was the first occasion on which Mr. Paddon had personally met the members of the Association, though when with his permission visiting works around London with which he was associated, they had received from him cheery messages of goodwill. They now had an opportunity of thanking him for the kindnesses he had shown them in this way. At Mr. Frost's call, the guests drank enthusiastically to "Continued Prosperity to the Brighton and Hove General Gas Company," coupled with the name of Mr. Paddon.

At the Portslade Gas-Works.

After spending a short time in the pretty grounds surrounding the Pavilion, there was a drive by motor coach to Shoreham, for an inspection of the Company's well-known Portslade Gas-Works—built in 1870, and since 1885 the only manufacturing station of the Company. Here a photographer was in waiting; and on the completion of his brief attentions the tour was begun. In this portion of the proceedings, Mr. Rutter was assisted by the following members of his staff, who acted as guides: Messrs. Corfield, E. A. Harmes, Diamond, A. Harmes, Adams, Palmer, and Carrington. Mr. Rutter himself was throughout the day determined to leave undone nothing that could be done for the comfort of the visitors; and Mr. P. E. Browne, too, ably carried out his share of the work in making the preparations in connection

with the lunch. As to the Portslade works, the large modernizing scheme which has followed upon the growing demand for gas in the Company's area was the subject of illustrated descriptive articles in the issues of the "JOURNAL" dated May 11 and 25, 1921; and to them those desiring a detailed account of much of the work that has been carried out may be referred. For the purpose of the visit, the Company had prepared in pamphlet form a concise description, with photographs and plans, of the works and plant; and this enabled the members to clearly follow everything as they went round.

The works—which are built on a strip of land situated between the sea and the eastern arm of Shoreham Harbour—consist of four independent sections, all inter-connected for convenience of manufacture. They represent various periods of works design, inasmuch as they were constructed at intervals of about ten years—No. 1 section in 1870; No. 2 section in 1881; No. 3 section in 1891; and No. 4 section (carburetted water-gas plant) in 1895 to 1900. Since the latter date there has been a gradual process of reconstruction and improvement, to bring the apparatus up to modern ideas and requirements. This is especially noticeable in No. 1 section, which, during the years 1919 and 1920, has undergone complete renovation; and the whole of its manufacturing plant is entirely new. Coal comes by sea; Stothert and Pitt electric cranes discharging the steamers by means of grabs at the rate of 90 tons per hour, and depositing the coal in a 60-ton hopper on the end of the gantry. From this hopper, the coal drops on to a rubber-faced cotton band conveyor of 90 tons capacity, and, after passing over a Blake-Denison weigher, is conveyed along the gantry to two 45-ton per hour coal-crushers situated between Nos. 1 and 2 retort-houses. From the latter machines the coal is taken in two bucket elevators up to the extreme top of the retort-houses, delivering on to a band of similar capacity to the one already described, running the whole length of No. 1 retort-house; and they will ultimately serve a similar band in No. 2 house. The coal-bunkers in No. 1 retort-house are nine in number, with an aggregate capacity of 750 tons. The band is provided with a traversing throw-off carriage, for discharging the coal into any of the overhead bunkers. An extension of the first conveyor on the gantry carries the coals to the stores, which are placed in the rear of the retort-houses. It is intended to instal a pneumatic coal-handling plant for removing the coal from stores to retort-house. The cost of discharging the steamboats in the manner described is between 5d. and 6d. per ton delivered into the overhead bunkers.

Some time was spent in No. 1 retort-house. Here the carbonizing plant consists of two blocks each of ten settings of ten 24 in. by 16 in. ⏢ retorts 23 ft. long. These retorts are capable, when fully charged, of holding 19 cwt. of coal for twelve-hour carbonization; but to carbonize this quantity of coal requires a very high temperature in the combustion chamber, approximating 2450° Fahr. (1345° C.). The total capacity of the house is approximately 4,000,000 c.ft. per day; but with very full charges this can be increased to 4,200,000 c.ft. The stage floor of the house is constructed in reinforced concrete; and the overhead coal-bunkers are also in reinforced concrete—both being on the Indented Bar Company's system. This method of construction has proved perfectly satisfactory at Portslade; and similar concrete construction is being installed for the floors and coal-bunkers in No. 2 house. There are in the house both Guest-Gibbons and Fiddes-Aldridge charging machines. The latter machine was installed early in the present year, and gives complete satisfaction, and is, it was pointed out, considerably faster in action than the Gibbons machine. The coke is handled by means of Drake transporters, which discharge through the window-ways of the house on to an outside quenching bench constructed in reinforced concrete, and paved with firebricks. This method of coke-handling has proved entirely satisfactory, and has the advantage of disposing of the coke quickly out of the house, thus avoiding a considerable amount of smoke and steam. It has the further advantage of preventing the penetration of water or coke fumes into the basement floor. Thus the process of clinkering the furnaces is effected in cleanliness and comfort. The coke is removed from the quenching bench by means of skips, which travel on a telpher track running the whole length of the coke ground, and can be discharged either into storage hoppers for filling carts and sacks or direct to a bunker for the supply of the carburetted water-gas plant. The machinery in No. 1 section retort-house and the coal-handling plant is electrically driven.

The visitors were greatly interested also in No. 2 retort-house, which at the present time is under reconstruction. In this house it is intended to instal a 4 million c.ft. plant, similar to No. 1 house. At present ten arches are being erected, and settings will be built in five of these to provide a plant capable of producing 1 million c.ft. a day next winter. No. 3 retort-house is now derelict; and the eastern portion of it will ultimately be used as an additional coal-stores. The western half of the house contains the water-gas plant, which consists of five Humphreys and Glasgow carburetted water-gas sets, four of them being equal to 1½ million c.ft. per day, and the fifth to 2 million c.ft. per day. The larger set is controlled by hydraulic valves and electrical automatic gear, which effects a considerable saving in labour. It also has an automatic coke feed direct from the overhead coke bunkers; the other sets being fed from the usual coke buggies. The coke is elevated to the conveyor feeding the overhead coke bunkers by means of a large Drake coke transporter fed from the reinforced concrete coke bunker. A turbo blower is installed in the engine-room below the stage floor; and three blowers driven by reciprocating engines provide the blast for the smaller sets.

The coal-stores lie at the rear of Nos. 1 and 2 retort-houses, and are designed to hold, to the rail level, approximately 13,000 tons. With trimmings, however, a total of 18,000 to 20,000 tons can be stored. The stores are divided by cross walls into compartments holding from 800 to 1200 tons, which enables any spontaneous combustion of the coal to be isolated. Tubes 3 in. in diameter are inserted to the full depth of the coal at regular points throughout the stores; and the temperature is taken in each tube at frequent intervals, so that any undue heating is immediately revealed. The practice is to remove at once the upper portion of the coal at that spot; and almost invariably the temperature is reduced to normal. Directly the temperature exceeds 100° Fahr., danger is anticipated, and action taken.

There is provision for boosting the gas to the holders at Hove and Blackrock; this being necessary on account of the distance from the manufacturing station. In No. 1 engine-house there is an interesting example of an old reciprocating exhauster originally erected at the Hove Gas-Works in 1865. This is driven by a beam engine made at the same time as the exhauster; and both are in excellent condition, and still doing useful work. The washers are all of the Livesey type, but are constructed to the Brighton design. The scrubbers are of the rotary perforated plate type; the original having been invented by the late Mr. J. B. Paddon, who was Engineer of the Company up to 1885. In No. 1 section the original experimental rotary scrubber is still at work. The declared value of the gas supplied by the Company is at the moment 470 B.Th.U.; but from July 1 it will be 500 B.Th.U. It is anticipated that the total output of gas during the current year will be about 2000 million c.ft.

ACKNOWLEDGMENTS.

Tea was served before leaving the works, and then the President made reference to the enjoyable and instructive time that had been spent. He had, he said, been greatly impressed with the lay-out of the works from an engineering point of view. Among a great many striking features, the excellent installation of coke-conveying plant had appealed to him strongly. It was the first time he had seen an arrangement of this kind at work. By its aid things were made very comfortable for the men who had to work in the retort-house. He again acknowledged the indebtedness of the visitors to the Chairman and Directors and the staff of the Company—two members of which (Mr. Corfield and Mr. Browne), he recalled with pleasure, had formerly been on the roll of their Association.

Before returning to the town, a hearty vote of thanks to their hosts was passed, on the proposition of Mr. D. C. Cross, seconded by Mr. S. B. Chandler, and supported by Mr. F. W. Cross. Attention was drawn by the speakers to the cleanliness and orderliness of the works, and to the encouragement afforded the juniors by the presence of so many seniors at the gathering. Mr. Paddon, in acknowledgment, said that both juniors and seniors were equally welcome at the works.

SCOTTISH JUNIOR GAS ASSOCIATION.

(EASTERN DISTRICT.)

Visit to the Montrose and Brechin Gas-Works.

On Saturday, June 10, members of the Association paid a visit to the gas-works at Montrose and Brechin; there being a party of about 35.

In the forenoon Montrose was visited. There the visitors were received by Mr. David Smith (the Chairman) and Mr. D. M'Intyre (Engineer and Manager) of the Montrose Gas Company. The new installation of Glover-West vertical retorts was the object of much interest, and an instructive time was spent. Mr. M'Intyre explained in detail the working of the plant and general arrangement. The party were entertained at lunch, when Mr. Smith, in a few remarks, conveyed a welcome from the Directors of the Company. Mr. A. M'Donald (Prestonpans), Past-President of the Association, replied; and a hearty vote of thanks was accorded the Company and Mr. M'Intyre.

Subsequently the party motored to Brechin, where Mr. S. Edwards (a Director), Mr. H. Anderson (the Secretary), and Mr. Allan Reid (Engineer and Manager) of the Brechin Gas Company welcomed them. Mr. Edwards, referring to the absence of the Chairman (Mr. J. Guthrie) of the Company, said it might be of interest to the members to know that Mr. Guthrie was at present parliamentary candidate for the Burgh of Moray and Nairn. If he were successful, he thought Mr. Guthrie would be the first Scottish M.P. who was a director of a gas company. He (Mr. Edwards) was glad to see such a large turn-out, and in the name of the Company had much pleasure in welcoming the Association to the ancient city of Brechin. Mr. W. A. Dearden (Dunfermline), President, voiced the thanks of the Association to the Company and to Mr. Allan Reid for the kindness and hospitality extended to them. He complimented the Company on possessing such up-to-date and well-equipped works. The chief object of interest was the Woodall-Duckham vertical retort setting, which was installed nearly two years ago.

A successful day's outing terminated with a motor run to Montrose; the members expressing themselves delighted with their visits, arrangements for which had been in the hands of the Hon. Secretary and Treasurer (Mr. R. L. Laing, of Brechin).

ALLEN'S PATENT IMPROVED TUBE CLEANER.

Boilers that are in continuous use for months on end lose their efficiency rapidly, due to the deposit formed on the internal surfaces of the heating tubes; and unless this is removed periodically, it constitutes a considerable loss of heat, as scale is a bad conductor. Many devices for overcoming this evil are in use—such as tube sweepers and cleaners. Among others the "Pilot Adjustable Tube-Cleaner Head," as patented by Mr. J. J. Allen, engineer, of Crook, Durham, deserves more than passing mention, because, from long experience of ordinary machines, he has brought his device up to a high degree of perfection.

Fig. 1 shows a cleaner (that is provisionally patented for cleaning tubes) with any of the following drives: Rod, flexible shafting, or water turbine. This machine is said to have few equals for the removal of scale, no matter whether the deposit is of the hardest nature or of such an extent as to practically close the tubes. It is constructed of the hardest steel throughout, and embodies all the latest improvements.

The "Pilot" tube cleaner has been greatly improved by Mr. Allen, by the invention of a special device for the cutter arms as illustrated (fig. 2, new method). These have pads cast on them to rest on the central spindle, as shown in the sketch. This pad keeps the arm up to its work, and also prevents the cutter wheel fouling the preceding arm. Several other additional improvements have been installed to make the machine simple, strong, and less costly in operation. The rope wheels are placed in true alignment, thus saving wear and tear on the cotton driving ropes. The rod couplings have been strengthened and improved to prevent them coming apart when in work. The control handle has an improved method of attachment to the feed spindle, and makes same absolutely secure when the machine is in use. The machine is driven by a 5-H.P. motor. The cleaning head travels at the rate of 1400 R.P.M., and is kept in a true central position by means of a carrier. The cutter arms on the cutter head are free to be thrown out (within certain limits) by centrifugal force; so that the cutter wheels will enter any depressions caused by blisters that may be in the tubes, cleaning out all sediment that may be deposited therein. The tube-cleaning head is constructed of a series of the disc (fig. 2, new method) and cutter arms and cutter wheels.

The machine has been thoroughly tested under the most severe conditions; and it is felt that there need be no fear about its giving every satisfaction to those who require a machine for hard work.

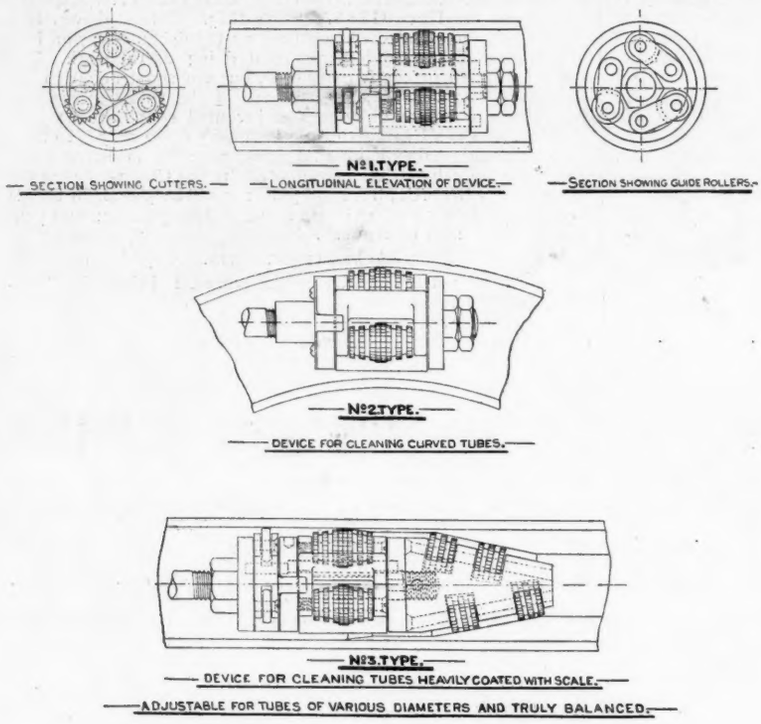
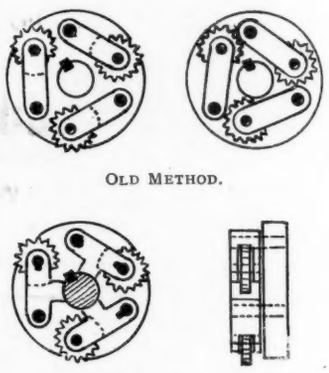

SECTION SHOWING CUTTERS.
No1. TYPE.
LONGITUDINAL ELEVATION OF DEVICE.
SECTION SHOWING GUIDE ROLLERS.
No2. TYPE.
DEVICE FOR CLEANING CURVED TUBES.
No3. TYPE.
DEVICE FOR CLEANING TUBES HEAVILY COATED WITH SCALE.
ADJUSTABLE FOR TUBES OF VARIOUS DIAMETERS AND TRULY BALANCED.

Fig. 1.

Provisional Patent No. 20,231.



OLD METHOD.

NEW METHOD.

Patent No. 114,090.

Fig. 2.

DORMAN'S PATENT "FLEXSTEL" JOINTS.

THERE are many users, for many different purposes, of the Dorman patented flexible "Flexstel" joints, which are made in various metals and materials to suit these different conditions, and of from ¼ in. to 12 in. bore. They are guaranteed to withstand successfully the highest fluctuating and intermittent pressures for gas, steam, acids, oil, water, &c., and are standardized and interchangeable. The makers—Messrs. W. H. Dorman and Co., Ltd., of Stafford—giving a list of some of the users in connection with a wide range ot manufacturing processes, add: "We have never had a single failure."

As has already been explained in the "JOURNAL," "Flexstel" flexible steel piping—consisting of the patented joints, constructed with plain piping of varying lengths—is made of a series of double sockets, each socket including two ball-joints. Between each double socket there is a length of solid drawn tubing, on each end of which is firmly secured a steel ball. The pressure end of the ball is cut away to form a recess for the packing ring. The construction is such that the pressure on the packing ring is automatically adapted to suit the pressure in the pipe. A perfect seal is thereby assured at all pressures. A pipeline may be made-up to give varying degrees of flexibility at any special points in the line by the insertion of different length tubes at these points. The pipe may also be used in connection with solid pipelines at any point where flexibility is required.

Extensive and severe tests have been carried out by the National Physical Laboratory to prove the durability of "Flexstel" joints. A ½-in. bore pipeline was submitted to the Laboratory for destructive test; and it ultimately gave-out under a pressure of 9·2 tons per sq. in., when the pipeline metal actually fractured—the joint being perfectly fluid-proof till fracture occurred. A booklet just issued by the firm describes and illustrates the various forms and uses of the joint.

THE GAS-TURBINE.

The application of the principle of the internal combustion engine to the turbine has, says the "Chemical Trade Journal," been a matter attended with considerable difficulties. The main trouble has always been that at the very high temperature of the gas-air mixture explosion—usually about 2800° to 3500° Fahr.—no metal could be found of which to construct blades capable of withstanding the severe conditions; 800° to 900° Fahr. being, in fact, the maximum temperature that can safely be employed. With the best steam-turbine, an efficiency of from 20 to 22 p.ct. is the most that can be obtained; but a practicable gas-turbine should run at an efficiency of at least 30 p.ct., and probably considerably higher. The problem appears, however, to be now well on the way to solution, if the claims made in Germany for the "Holzwarth" gas-turbine are substantiated. In this machine there are from six to ten combustion chambers, to which the explosive mixture of gas and air is distributed. The products of the explosion are in actual contact with the turbine blades for about one-tenth of a second only; and the action resembles that of machine-gun fire against the blades, and differs from that in the ordinary steam-turbine, in which there is a steady and continuous stream at a given pressure. The point is that, in the intervals between the actual impact of the explosive mixture, the turbine blades have time to cool; and the material used (soft steel) is stated to stand the action quite well. At the present time a 10,000 KW. gas-turbine to run at 1500 revolutions per minute is being built.

Southern Association of Gas Engineers and Managers.—The Association have accepted invitations to visit the works of the Davis Gas-Stove Company, Ltd., at Luton, and of the Luton Gas Company, on Wednesday, the 19th prox.

CORRESPONDENCE.

[We are not responsible for opinions expressed by Correspondents.]

Strictures from the Welsh Meeting.

SIR,—I doubt if many of your readers will consider a "presidential address" the best medium for the expression of criticisms on details of policy and administration such as those to which Mr. Robb gave voice at the recent meeting of the Wales and Monmouthshire District Institution in respect of the "B.C.G.A.," among others. The policy of this Association is determined by a General Committee representing the subscribing undertakings in every district in the kingdom, and is administered by an Executive Committee and officers responsible to them, elected by the General Committee and also representative of each district. By those Committees and by those officers, criticism and suggestions are heartily welcomed and most carefully considered. I think, however, there will be general agreement that any manager who has criticisms or suggestions to make concerning its work will better further the interests of such an organization, and of the industry it exists to serve, by putting them forward (at least in the first instance) through the representatives of his district on the Executive (or General) Committee, than by first launching them at a public meeting where there may be no one present prepared, without notice, to answer in detail criticisms that will then be made public to the industry at large and to its very active competitors, with all the importance given to them by their inclusion in a "presidential address," *plus* editorial comment.

Fortunately, as you remark, Mr. Mason was present at the Welsh meeting—though only as a visitor, not as a matter of course—and was able to answer some of Mr. Robb's points at once, particularly that in regard to the Association's attitude to the lighting question, of which the importance is fully recognized; though naturally the address, and especially your comment upon it, is likely to be read by many who neither heard nor will have read that reply. As, moreover, you add a criticism expressed to you by "a prominent man in the gas industry"—which he also expressed to me and so gave me an opportunity to give him the answer—I should like briefly to deal with Mr. Robb's criticisms and your comments.

First of all, I would say that no one expects that the expert work of publicity (in all the aspects of that wide-meaning description of activity) carried on by an Association on behalf of some 700 gas undertakings could be conducted on lines that would meet with the approval in detail of all the managers of all those undertakings, who cannot all have given to the subject the daily study for years which those responsible for the work have given and do possess, and cannot all have the knowledge of what is being and what can be done. Naturally, the details of its work are the subject of frequent discussion, criticism, and eventual harmonizing of opinion by the Committees—the General Committee as to policy and the Executive as to administration, who have before them all the facts and the advice of their experts—facts and advice which they would not, and your readers would not, consider it expedient to publish for the information of the world at large, including the very active competitors who are giving, and are only too anxious to give, the Association "the sincerest form of flattery."

There is, therefore, no occasion to advise members "to pause occasionally and scrutinize what is being done;" for the scrutiny is constant, and the opportunities for criticism by subscribing undertakings are frequent—namely: Direct to the officers; through their Committee representatives; at the various district conferences; and *when paying their purely voluntary subscriptions*, which have steadily increased both in number and amount throughout the ten years of the Association's existence. The last-mentioned fact goes far to answer the questions: Is the money subscribed being wisely expended; and does the work meet with the approval of the subscribers? As I have already said, no one expects that every detail of that work can be approved by every one of 700 members. On any single piece of advertising copy, half-a-dozen experts will express probably as many varying opinions. But, broadly speaking, it is true that "money talks;" and money in this case has been eloquent of very general approval.

Next to deal with the criticism you report and which I had received (Is there any reason for not mentioning him by name?) from our old friend and constant supporter, the much-lamented Sir Daniel Goddard. His criticism was that there was no occasion to spend money on sending well-printed reproductions of some of our advertising and other matter descriptive of our work to our convinced supporters—of which the Tottenham Company was the very first. My reply was that if only every undertaking knew as much and was as keen about our work as he and Mr. Broadberry, there would be no occasion to do more than make annual application for the wherewithal to carry it on, but that practical experience had proved beyond a doubt that the distribution of such printed matter as that to which he referred secured the continuance of subscriptions by existing members and the addition of new subscribers to the list which paid the by no means serious cost many times over; and that we had many applications for additional copies from managers desirous of putting them before their directors, or, more often, their committees. The "Bulletin," as I pointed out, is now practically self-supporting, and anyway is "for private circulation only," not for the general information and assistance of non-subscribers and "our friends the enemy."

The "waning of advertisement in the public Press," of which you have heard private criticism, has been due, in so far as it is the fact, to a number of causes. First, until quite recently, managers all over the country begged us not to accentuate their war and post-war difficulties of supply, alike of gas and appliances, by publicity in the newspapers that would create immediate increased demand, but rather to direct our attention to educative work in other publications and other directions that would be ultimately rather than instantly productive—in itself no small tribute to the effectiveness of general Press publicity. That the educative work thus increased has been of much value, we have good reason to know—at least among the architects to whom Mr. Robb refers and of whom he judges from inadequate data. In no direction has the work of the Association been more fruitful for the industry, in recent times especially, when housing has been the question of the day; and in no direction will the future harvest be greater.

Secondly, a larger proportion of the Association's expenditure has been allocated to the provincial Press, at the request of many members, so that there has not been so much available for the general (or national) Press. And, finally, the cost of newspaper space has increased enormously as the result of the war. So that "whole-page advertisements costing £800"—on which the Association has never spent a penny piece—or such advertisements costing far less on which we used to spend money to the great and immediate profit of the industry, and on which we are often asked by members to spend it now, have been out of the question, and will be until space prices come down very much or our income is greatly increased.

As to money spent on conferences, I can assure Mr. Robb, and those inclined to agree with him, that the expenditure on conferences—which is almost all provided, not by the Association, but by the undertakings in whose towns or cities the conferences are held, and who are more than satisfied at the resultant effect on business prospects—is exceedingly fruitful, though I cannot here wisely go into details. The holding of those conferences is the considered, and frequently renewed, policy of the General Committee, on which very many important financial supporters of the Association are represented. The last sentence, indeed, is a general answer to the criticisms with which I have very inadequately dealt in an already too long letter, which I will conclude by repeating that criticisms and suggestions communicated to Headquarters are welcomed at all times and given every consideration.

F. W. GOODENOUGH,
Chairman of Executive Committee.
British Commercial Gas Association.

No. 30, Grosvenor Gardens, S.W. 1.

The Royal Engineers.

SIR,—It was with feelings of resentment that I read in last week's "JOURNAL" the references of Mr. Robb, in his presidential address to the Wales and Monmouthshire Institution, to "the so-called Royal Engineers (pardon the title)." I myself had the honour of serving in that corps during four-and-a-half years of commissioned service; but I regret my knowledge of history is insufficient to deal adequately with my protest, and I think Chatham would not trouble to protest at all.

Mr. Robb's intimacy with the last war and its organization must be very slight indeed, or he would not thus describe one very small section of a corps which did magnificent work in many fields. If he troubled, he could find out that Chepstow was run by a water transport department of the corps, and that the rank and file were composed (I write some years after demobilization) mostly of artizans medically unfit. Of the officers I cannot speak, except that at some time they had probably had the fortune to practise military engineering at the front. It is the R.E. who design very efficient bridges (and demolish them in face of the enemy), who tunnel, who lay-out and supervise work in uncomfortable proximity to Very lights and snipers, who carry pipe-lines over leagues of desert ("The Castle," Monmouth, could supplement my remarks). The Flying Corps and the Signals sprang originally from the Sappers. My parents, Sir, spent a goodly sum on my training; and when my articles were *half* finished I joined the Sappers and forgot the possibilities of a civilian situation. Fellows with half-finished articles were once a godsend to the country, although at the command of high places they sometimes wasted money.

"*Ubique, quo fas et gloria ducunt*"—a corps with such a motto is liable to be found in strange places, even in a National Shipyard credited with a measure of "*nefas*."

GAS MAN (ex-R.E.).

The Mantle Inquiry.

SIR,—You are no doubt aware that at the present time the British Mantle Manufacturers' Association are endeavouring to secure protection from the Board of Trade under the "Safeguarding of Industries Act, 1921," Part II.

The first meeting was held on Thursday last, a report of which has already appeared in the daily newspapers. At this meeting the opposition asked for an adjournment for three or four weeks in order to secure evidence in favour of the importation of German mantles. It was resolved by the Council that this delay could not be granted, but that the meeting should be adjourned until Monday next, the 19th inst. When this meeting takes place, there will be present the President of the "German Mantle Convention" and several other German mantle manufacturers.

Although the British Mantle Manufacturers' Association do not object to German representatives attending Monday's meeting, yet they cannot understand why the invitation has been extended to them to give evidence against an established British industry, in view of the grave state of unemployment in this country.

During last year, the B.M.M.A. had occasion to draw attention to the grave unemployment then existing in the gas-mantle industry through the competition of foreign mantles, which were being imported at prices below British cost of production. The Council made appeals to the gas companies and lighting authorities to help to stay the growing unemployment by using only British-made mantles for public lighting and maintenance. The Council were gratified by the many replies they received, which showed a willingness on the part of gas managers to support British industry.

Since the issue of the circulars, the foreign competition has been intensified—for one reason on account of the further depreciation of the German mark. As a result, some factories have been compelled to close-down altogether, and unemployment in others has been increased. The Gas-Mantle Manufacturers have accordingly presented a case under Part II. of the Act asking for a duty to be imposed upon German-made mantles, on the ground that the depreciation in currency constitutes unfair competition, resulting in unemployment in this country.

They further point out that a continuation of the rate of present importation will cripple the British manufacturers remaining in the

incandescent mantle and subsidiary industries beyond power of recovery, and must result in further unemployment, leaving still more workers to be a charge upon the community; and that the extinction of British manufacture would in the long run defeat what is understood to be the desire of the Executive Board—viz., the maintenance of competition in gas-mantles.

The position might well revert to that which was developing in 1913 and 1914, when the German manufacturers, by reason of their control of the raw materials of the industry, had determined to set up a trust under their own domination to control the prices and supply of gas-mantles throughout the world. This danger was averted by the war; and all the raw materials, as well as the mantles themselves, have been, and can be, produced in this country; but unless the manufacturers receive adequate support, these industries will be destroyed, and the Germans will achieve their avowed object of again dominating the industry.

The gas-mantle industry does not object to fair competition, and is only asking for security against abnormal conditions for which the Legislature has made provision. You will, therefore, appreciate that the result of next Monday's meeting is of the most vital importance to the gas-mantle industry in this country.

Nos. 132 *and* 134, *Fleet Street, E.C.,*
June 13, 1922.

REGINALD H. PALMER.

REGISTER OF PATENTS.

Recording and Integrating Gas Calorimeters. No. 180,080.

BOARD OF TRADE, SECRETARY OF, and BOYS, C. V., of Victoria Street, S.W.

No. 6267; Feb. 24, 1921.

The general principles of this invention are given in the front portion of this week's "JOURNAL"; pressure on our columns prohibiting the reproduction of the full text and illustrations of the specification, which covers nearly twenty printed sides and includes twenty illustrations (in seven sheets) of the instrument and its component parts. For record purposes, however, we publish the patentees' claims, which are—

1. A method of controlling the rate of liquid flow in a flow-gas calorimeter and of adjusting this rate accurately to a predetermined value, which consists in trapping at regular intervals of time a stream of liquid by means of a tipping vessel and causing such trapped liquid automatically to effect tipping of the vessel, with consequent discharge of its contents.

2. In combination, a tipping vessel, trunnion pins thereon, and horizontal supporting surfaces for the pins adapted to permit tipping of the vessel with rolling friction only, in contradistinction from sliding friction.

3. Provision of a water chamber which receives the incoming water, while the vessel is tipped, and conveys it to a water-wheel or the like driving the gas-controlling means.

4. A flow gas calorimeter in which the combustion circuit and heat interchanging structure are readily removable and replaceable.

5. A flow gas calorimeter including a combustion chamber, a hot thermometer bulb, a container surrounding the combustion chamber and hot thermometer bulb, a highly conducting shield surrounding part of the container and connected thereto, and circulating fluid passing in contact successively with the hot thermometer bulb and with that portion of the conducting container to which the highly conducting shield is connected.

6. A flow gas calorimeter including a poorly heat-conducting case, a coiled conduit therein and surrounding a container adapted to convey circulating fluid, insulation round the container and a space round it adapted to convey air in contact with the exterior of the coiled conduit for combustion, thus unifying the temperature of the air for combustion and of the circulating fluid without saturation of the former.

7. A recording gas calorimeter including an operative thermometer containing a non-corrosive liquid, such as amyl alcohol, the effect of whose "*b*" expansion coefficient is so small compared with that of its "*a*" coefficient as to be negligible.

8. A recording gas calorimeter including a hot operative thermometer chamber and a cold operative thermometer chamber, recording means, an operating lever, co-acting with both chambers and adapted to magnify the differential movement of the chambers in an inverse ratio to the relative linear movements of the individual chambers with common temperature rise but in opposite directions, and to effect movement of the recording means.

9. A recording gas calorimeter including a recording arm supported upon a lantern capable of rocking about a vertical axis and mechanism effecting integration of the departure of the recording arm from a predetermined position.

10. A recording gas calorimeter including a rocking frame, a detachable pen frame, a conical recess, and a V groove in one of the frames, projections on the other frame adapted to co-operate respectively with said recess and groove, a pen and an ink reservoir carried on the pen frame and a capillary ink connection between pen and reservoir.

11. In a gas calorimeter as claimed in any of Claims 2 to 10, a gas-meter element including a rotating gas-containing member partially immersed in liquid wherein the gas-passing capacity is a simple function (preferably a sine function) of the liquid level.

12. The combination in a gas calorimeter as claimed in any of Claims 2 to 11 of a gas-meter whose gas-measuring element includes a pair of two-part chambers, one pair turned relatively to the other through substantially a right angle, a gas-inlet mantle adjacent one of said two-part chambers and a gas passage connecting each chamber respectively with the mantle.

13. The provision in a gas calorimeter as claimed in any of Claims 2 to 12 of a gas-meter element including a power-driven spindle, a rotatable gas-measuring member mounted thereon, and rotated independently thereof by gas pressure, and means effecting longitudinal movement of the rotating member upon the occurrence of relative rotation between the spindle and rotatable member, a gas inlet and controlling means operated by the said longitudinal movement.

14. A method of maintaining constant the volume of gas, if measured at standard temperature and pressure, and saturated with water vapour, passed in unit time by a gas measuring and delivering device operating as an element in a gas calorimeter, as claimed in any of Claims 2 to 13 (notwithstanding possible deviation from predetermined conditions of barometric pressure and temperature) which consists in causing a liquid level to vary automatically in accordance with such deviation and causing the liquid level to determine the gas-passing capacity of the measuring and delivering device.

15. Means for carrying out the method claimed in Claim 14, which include a capillary overflow syphon, pivoted supporting means therefor, and liquid supplying means adapted to feed liquid at a smaller rate than the maximum rate of discharge through the syphon.

16. A flow gas calorimeter constructed and operating substantially as described with reference to the accompanying drawings.

17. A flow gas calorimeter including accuracy checking means, substantially as described with reference to any of the drawings.

Prepayment Mechanism.—No. 179,401.

TAUNTON, R. P., and MCINDOE, R. W., both of Birmingham.

No. 10,458; April 9, 1921.

This invention relates to prepayment mechanism for gas-meters of the type in which reduction gearing is introduced between the gear member of the return mechanism operated by the meter and the gear member on the measuring-out shaft, in order to increase the amount of gas allowed when a coin of greater value is intended to be used. The object is to improve, simplify, and cheapen the means whereby the reduction gear is brought into use when necessary.

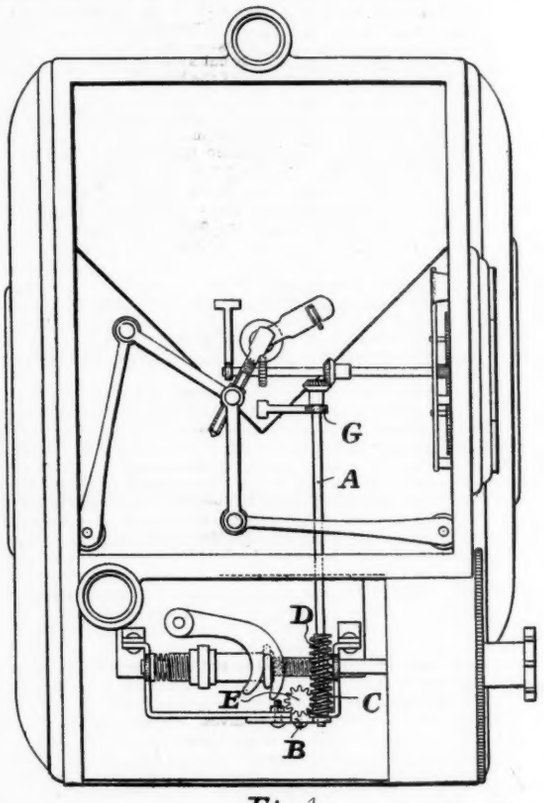


Fig. 1.

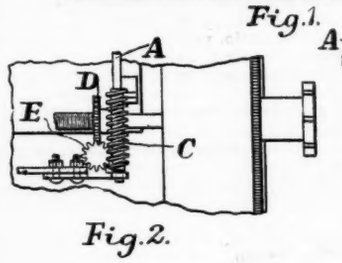


Fig. 2.

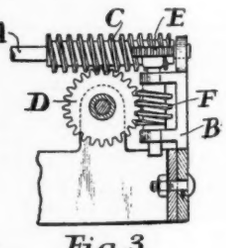


Fig. 3.

Taunton's and McIndoe's Prepayment Mechanism.

Fig. 1 of the accompanying drawings is a plan of the prepayment mechanism and reduction gearing in accordance with the invention. It shows the reduction gearing out of action, as when a coin of small denomination, such as a penny, is to be used. Fig. 2 is a plan of the reduction gearing in use, as when a coin of larger denomination, such as a shilling, is to be used. Fig. 3 is a cross-section, on a larger scale,

through the measuring-out spindle, showing in sectional elevation the adjustable bracket upon which the reduction worm gear is mounted.

The meter-driven shaft A (driven from the vertical meter spindle by any convenient means, such as by worm and bevel gears) passes through a slot in a partition into the mechanism chamber, and its extremity is mounted in a bearing formed in an extension of a bracket B which is slidably adjustable (in a plane transverse to the axis of the shaft) upon a suitable frame. The shaft A carries a worm C which, when a penny or other coin of small denomination is being used to operate the meter, meshes with a worm-wheel D on the measuring-out spindle, as shown in fig. 1. The slidably adjustable bracket B carries, between two parallel ears, a rotatable worm gear comprising a worm-wheel E constantly in mesh with the meter-driven worm C, and rigid or integral with a worm F (fig. 3) which, when the meter-driven worm is in mesh with the worm-wheel on the measuring-out shaft, runs idly. The sliding carrier B is provided at its lower end with a lateral extension slotted longitudinally, and engages studs carried by the frame member. This allows of the lateral adjustment or sliding movement of the carrier, which can then be fixed in its adjusted position. To convert the mechanism for use with a coin of larger denomination, such as a shilling, the carrier or bracket B is moved laterally by hand so as to disengage the worm C on the meter-driven shaft from the worm-wheel D on the measuring-out shaft, and then to take the worm F of the reduction gear into mesh with the worm-wheel D on the measuring-out shaft; thus effecting the desired reduction between the latter shaft and the meter-driven shaft. During this conversion, the shaft A is displaced through a small angle, which is allowed for by the slot and a bearing G.

Carriers for Incandescent Mantles.—No. 179,763.

CARPENTER, C., of Old Kent Road, S.E. 15.

No. 8831; March 22, 1921.

Patent of addition to No. 176,478; Dec. 2, 1920.

This invention relates to a modification of the invention described in specification No. 176,478, in which a carrier for supporting an incandescent mantle is provided with a strengthening ring, the carrier or the strengthening ring being perforated or cut away so as to restrict or deflect as little as possible the ascension of the hot air and gases from the burner.

According to the present invention, the carrier and the strengthening ring are formed separately, and are subsequently secured together by a bayonet and socket joint, or are cemented together with clay or other suitable material. By forming the parts separately, the patentee claims that the life of a carrier is prolonged, as expansion and contraction between the two parts can take place. There is also the further advantage that the carrier can be made more cheaply. Preferably the ring is so constructed that it can be fitted to existing mantle carriers of usual form.

Gas-Heating Stoves.—No. 156,656.

KÄMPE, H., of Berlin.

No. 642; Jan. 6, 1921. Convention date (Germany): Dec. 22, 1919.

This invention refers to gas-heating stoves which comprise in combination an open-fronted frame constituting a fireplace containing a lining, heat-radiating bodies, and Bunsen burners, for the direct radiation of heat, and a superstructure comprising hollow vertical heat-radiating bodies through which the gases pass to the chimney. The fireplace is constructed to occupy the entire cross-sectional area of the frame; and the hollow vertical bodies occupy substantially the entire cross-sectional area immediately above the fireplace, and have their interiors open where they communicate with the fireplace. The superstructure has an opening at the top for the escape of gas.

APPLICATIONS FOR PATENTS.

[Extracted from the "Official Journal" for June 14.]

Nos. 15,601 to 16,188.

ANDREW, T.—"Pressure-reducing valves." No. 15,743.
BAKER, E. J.—"Gas-torches." No. 15,864.
BOND, W. N.—"Velocity-meter for fluids." No. 15,988.
BROADHEAD, J. B.—"Valves for regulating the flow of fluids, &c." No. 16,148.
CARBIC, LTD.—See Baker, E. J. No. 15,864.
FLAVEL, P. W.—"Gas-burners." No. 15,843.
GIBBONS BROS., LTD.—"Furnaces, &c." No. 16,015.
GOLDSCHMIDT AKT.-GES. T.—"Enriching gases and vapours in gas mixtures." No. 16,087.
GOLSENKIRCHENER BERGWERTS AKT.-GES. ABTEILUNG SCHALKE.—"Cooling coke." No. 15,720.
HUMPHREYS & GLASGOW, LTD.—"Vertical retort gas-making apparatus." No. 15,755.
HUMPHREYS & GLASGOW, LTD.—"Alarm signal for automatic water-gas set." No. 15,756.
LUDFORD, E. M.—"Valves, taps, &c." No. 16,046.
MASTERS, R.—See Gibbons Bros, Ltd. No. 16,015.
MILES, G. H.—"Taps." No. 15,686.
RUSSELL, F. J.—"Taps or valves." No. 15,739.
SEARLE, R. M.—See Humphreys & Glasgow, Ltd. No. 15,755.
SMITH, LTD., J. & W. B.—"Gas-burners." No. 16,175.
SOUTH METROPOLITAN GAS COMPANY.—"Axle-boxes for side-tipping wagons." No. 15,844.
TAUSSIG, J. H.—See Humphreys & Glasgow, Ltd. No. 15,756.
WATKINSON, F.—See Smith, Ltd., J. & W. B. No. 16,175.
WILISCH, J. A.—"Device for separation of solid, liquid, and semi-gaseous matter from gases and vapours" No. 15,828.
WOOD, T.—See Broadhead, J. B. No. 16,148.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF LORDS.

Progress of Bills.

Neath Corporation Bill: The further Standing Orders have been complied with.

Windsor Gas Bill: Brought from the Commons; read the first time, and referred to the Examiners.

HOUSE OF COMMONS.

Progress of Bills.

Chester Gas Bill: Standing Orders not previously inquired into have been complied with; and the Bill is to be read a second time.

Croydon Gas Bill: Read a second time, and committed.

Windsor Gas Bill: As amended, considered; read the third time, and passed.

Buckhaven and Leven Gas Commission Order Confirmation Bill.

A Bill to confirm a Provisional Order under the Private Legislation (Scotland) Act, 1899, relating to Buckhaven and Leven Gas, was presented by Mr. Munro last Wednesday. On consideration of the Bill, Colonel Sir Alexander Sprot has given notice of motion to move the following clause:

The following provisions for the protection of the County Council of the County of Fife and the Kirkcaldy District Committee of that County Council (who for their respective rights, jurisdictions, and interests are hereinafter referred to as "the county authorities") shall, except so far as otherwise agreed upon in writing between the county authorities and the Corporation, have effect (that is to say):

(1) Notwithstanding anything in this Order or in the Burghs Gas Acts or the Acts incorporated therewith the Joint Gas Commissioners shall not without the consent in writing of the county authorities supply gas in any district in the county of Fife (excluding the burgh of Buckhaven and the burgh of Leven) which is not at the commencement of this Order supplied with gas by the Town Council of Buckhaven;

(2) Nothing in this Order or the said Acts shall authorize the Joint Gas Commissioners to break up or interfere with any highway, road, street, or bridge repairable by the county authorities without the consent in writing of the county authorities, which consent shall not be unreasonably withheld, and may be given upon such conditions as the county authorities may determine.

Lighting in Factories and Workshops.

The Third Report of the Departmental Committee appointed by the Secretary of State for the Home Department to inquire and report concerning adequate and suitable lighting of factories and workshops was presented (by command) to both Houses, and ordered to lie on the Table.

Public Utility Companies (Capital Issues) Act.

Copies were presented of reports on applications to the Board of Trade under the Act by the Brecon Gas Company, Herne Bay Gas Company, Ltd., and the Matlock and District Gas Company.

Imported Gas-Mantles and Taxation.

Mr. KILEY asked the Chancellor of the Exchequer what duty was being levied on ingredients of gas-mantles; when the collection of this duty was commenced; and what had been the amount so collected during the period it had been imposed?

Sir R. HORNE replied that, in accordance with the award of the Referee, duty at 33⅓ p.ct. was being levied on imported gas-mantles in respect of the value of the mechanical aggregates of oxide of thorium and oxide of cerium and of nitrate of thorium and nitrate of cerium being ingredients of such mantles. Pending authoritative determination of the value of these ingredients, delivery was being allowed, if the importer so desired, on deposit of a sum equivalent to the duty on a value of 25 p.ct. of the value of the complete mantles, subject to any adjustment that might prove to be ultimately necessary. In these circumstances it was not possible to give any reliable figure of the actual duty so far collected.

Mr. KILEY asked if any money at all had been received?

Sir R. HORNE replied he understood money had been received, but that it was subject to adjustment.

Mr. KILEY asked the Chancellor of the Exchequer what was the value of gas-mantles imported from Jan. 1 to May 31, 1922; and if he could give similar figures for the same period of 1921.

Sir W. MITCHELL-THOMSON (the Parliamentary Secretary to the Board of Trade), who replied, said the total value of incandescent gas-mantles registered during the first five months of this year as imported into the United Kingdom was £114,081. The corresponding value for the first five months of the year 1921 was £86,964.

GAS REGULATION ACT.

Application for Special Orders under Section 10.

Approval was given in the House of Commons last week to the motion standing in the name of Sir William Mitchell-Thomson in connection with the drafts of nine Special Orders proposed to be made by the Board of Trade under section 10 of the Gas Regulation Act, 1920. The undertakings referred to are: The Aylesbury Gas Company, the Coatbridge Gas Company, the Felixstowe Gas Light Company, the Hinckley Urban District Council, the Holyhead and North Wales Gas and Water Corporation, Ltd., the Rhymney and Aber Valleys Gas and Water Company, the Sittingbourne District Gas Company, the Southport Corporation, and the Farnham Gas and Electricity Company.

LEGAL INTELLIGENCE.

ALLEGED NUISANCE FROM A GAS-WORKS.

A Settlement at Burnham-on-Sea.

Sitting in the Weston-super-Mare County Court, on Saturday, the 10th inst., his Honour Judge STANGER, K.C., had before him (after a preliminary hearing) the first of a series of ten actions brought against the Burnham-on-Sea Gas Company. The plaintiffs in this first action were S. C. Mear, builder, of Jaycroft Road, Burnham-on-Sea, and W. W. Mear, his brother. As joint owners of No. 31, Jaycroft Road, they claimed £100 from the Gas Company as damages caused to their property by noxious emissions of gases and acids from defendants' works, as well as for personal inconvenience suffered. They also sought an injunction to restrain the Company from continuing the nuisance. The other nine plaintiffs are all resident in the same road; and each claimed a like sum as damages and applied for an injunction.

Mr. E. H. C. WETHERED (instructed by Mr. J. W. F. Jacques) was for the plaintiffs; and Mr. F. J. WROTTESLEY (instructed by Messrs. B. C. Board and Stilling) appeared for the Company.

Mr. *C. J. Waterfall*, analytical and consulting chemist, who had previously given evidence, was re-called and cross-examined. He said that though, since the previous hearing in April, the Company had increased the height of their chimney from 40 ft. to 105 ft., still the fumes did not pass away clear of the houses. The nuisance caused by the descent of grit was as bad as ever. He had never suggested that the raising of the chimney would obviate the trouble. Chemical fumes largely accounted for the destruction of cabbage crops, &c., in the gardens. The nuisance which existed ought to be minimized.

Mr. WROTTESLEY remarked that the Company would welcome any suggestions as to the manner in which improvement could be effected.

Mr. WETHERED replied that the matter had been going on for two years, and his clients had begged, prayed, and petitioned the Company to improve the conditions; but nothing had been done.

Miss *Gertrude White* gave evidence as to smoke, smells, grit, and noises at night from the works, and said that the "blacks" were of a larger size since the height of the chimney had been increased.

Mr. WROTTESLEY: I put it to you that since the chimney has been raised the smoke does not come near you.

Witness: I only wish it did not.

On both sides it was intimated that there were a number of experts and other witnesses to call. After the luncheon interval, however, the legal representatives, by permission of the Judge, attended a private consultation. At the expiration of an hour,

Mr. WROTTESLEY said they had not altogether wasted the time his Honour had been good enough to give them. Mr. Wethered and himself had had a conversation, and, what was really more important, Mr. R. A. Browning (the gas expert for the plaintiffs) and Mr. P. S. Hoyte (the gas engineer called in by the defendants) had joined in the discussion. As a result, they had been able to inform the plaintiffs of certain work which the Company really intended to carry out; and it transpired this was the very work which Mr. Browning had meant to suggest should be done. The "Tully" gas plant which the Company had put in was an experiment, and, like all experiments, had not worked as well at first as it would later. Consequently the Company intended to put in a device which was known as a water-box and spray. Having put up a tall chimney, the Company had successfully dealt with the fumes; but there could be no doubt that during the working of the last fortnight or so rather heavier cinders had been emitted than in the past. The engineers on both sides, however, agreed that an end would be put to this by the water-box and spray device. In addition, the Company were going to put in two beds of oxide of iron instead of having only one, with the result that one of these could be cleaned while the other was working. The Company were already constructing a new holder. The work had been delayed on account of the engineers' strike; but it would be completed with all due expedition. The result would be that the Company would have ample accommodation for gas, and anything in the shape of leakage would be put an end to or mininized. Further, the Company would take every precaution to prevent unnecessary noise. The effect of these assurances was that, by consent of the parties, this action and all actions would be withdrawn on terms which had been arranged. The four heads of agreement which had been drawn up were as follows:

(1) The Company to put in a water-box and spray device to be approved by Mr. Hoyte, the Plymouth Gas Company's Engineer.
(2) Two beds of oxide to be provided instead of one.
(3) The Company to complete the gasholder now under construction so as to permit the other one to be overhauled, &c.
(4) The Company would prevent all unnecessary explosions and smoke.

Mr. WETHERED said there had been a very satisfactory round-table conference, at which the Company's Directors and experts and the plaintiffs had taken part. The Directors had met them in a very generous way; they had been very candid, and had stated their difficulties, as well as what they proposed to do. If the new devices were installed and were properly managed, as he had no doubt they would be, the plaintiffs were satisfied that the nuisances of which they had complained would be abated.

His HONOUR observed that he entirely approved of the arrangements which had been arrived at. The parties had behaved in a very sensible and reasonable manner; and he considered the course which the case had taken promised to give better results in the future than if the action had been tried-out to the bitter end.

Reduction in Price at Reading.—The Reading Gas Company have given notice that the price of gas will be reduced from the June quarter meter readings to 10d. per therm.

MISCELLANEOUS NEWS.

GAS REGULATION ACT APPLICATIONS.

The following further notices have appeared in the "London Gazette" regarding applications to the Board of Trade for Orders under the Gas Regulation Act.

Alfreton Gas Company.

The standard price now authorized in respect of the supply of gas by the undertakers is 4s. 9d. per 1000 c.ft.; and the price they have asked the Board of Trade to substitute for this is 1s. 7·27d. per therm.

Holyhead and North Wales Gas and Water Corporation, Ltd. (Holyhead).

The maximum price now authorized in respect of the supply of gas by the undertakers is 5s. per 1000 c.ft.; and the price they have asked the Board of Trade to substitute for this is 1s. 9d. per therm.

Holyhead and North Wales Gas and Water Corporation, Ltd. (Llanfairfechan and Aber).

The maximum price now authorized in respect of the supply of gas by the undertakers is 5s. 10d. per 1000 c.ft.; and the price they have asked the Board of Trade to substitute for this is 2s. per therm.

Holyhead and North Wales Gas and Water Corporation, Ltd. (Llangefni).

The maximum price now authorized in respect of the supply of gas by the undertakers is 5s. 4d. per 1000 c.ft.; and the price they have asked the Board of Trade to substitute for this is 2s. 6d. per therm.

Holyhead and North Wales Gas and Water Corporation, Ltd. (Llanrwst).

The maximum price now authorized in respect of the supply of gas by the undertakers is 5s. 4d. per 1000 c.ft.; and the price they have asked the Board of Trade to substitute for this is 2s. 6d. per therm.

Holyhead and North Wales Gas and Water Corporation, Ltd. (Menai Bridge).

The maximum price now authorized in respect of the supply of gas by the undertakers is 7s. 6d. per 1000 c.ft.; and the price they have asked the Board of Trade to substitute for this is 2s. 6d. per therm.

Holyhead and North Wales Gas and Water Corporation, Ltd. (Penmaenmawr).

The maximum price now authorized in respect of the supply of gas by the undertakers is 6s. 4d. per 1000 c.ft.; and the price they have asked the Board of Trade to substitute for this is 2s. per therm.

Holyhead and North Wales Gas and Water Corporation, Ltd. (Pwllheli).

The maximum price now authorized in respect of the supply of gas by the undertakers is 5s. per 1000 c.ft.; and the price they have asked the Board of Trade to substitute for this is 1s. 9d. per therm.

SPECIAL ORDERS.

Chesham and District Gas Company.

The Company give notice of their intention to apply to the Board of Trade for a Special Order under Section 10 of the Act to enable them to acquire land, increase their borrowing powers, and to regulate the administration and gas supply.

Harrow and Stanmore Gas Company.

The Company are applying for a Special Order to empower them to construct and maintain gas-works, &c., on scheduled land, to acquire land, to increase the borrowing powers, to authorize profit-sharing, and to make new provisions regarding administration and gas supply.

Lea Bridge District Gas Company.

The Company intend to make application for a Special Order to authorize them to construct and maintain gas-works, &c., on scheduled land, to acquire land, to establish profit-sharing schemes, and to make new provisions regarding administration and gas supply.

DECLARATIONS OF CALORIFIC POWER.

Annfield Plain and District Gas Company.—500 B.Th.U. (June 24)
Haslingden Union Gas Company.—450 B.Th.U. (June 24.)
Rochdale Corporation.—475 B.Th.U. (Sept. 18.)

GAS REGULATION ACT ORDERS.

We have received from the Director of Gas Administration copies of the following further Orders made by the Board of Trade under section 1 of the Gas Regulation Act.

Bromsgrove Gas Light and Coke Company.

After the declared date, the standard price in respect of gas supplied by the undertakers shall be 15d. per therm.

For the purpose of ascertaining the authorized rate of dividend, any price charged per 1000 c.ft. before the declared date shall be rendered into the equivalent price per therm by dividing it by five-and-one-fifth. (June 16.)

Chapel Whaley and District Gas Company.

After the declared date, the standard price in respect of gas supplied by the undertakers shall be 15d. per therm.

For the purpose of ascertaining the authorized rate of dividend, any price charged per 1000 c.ft. before the declared date shall be rendered

into the equivalent price per therm by dividing it by four-and-nine-tenths.

Prepayment meter clauses are included. (June 16.)

Knottingley Gas Company.

After the declared date, the standard price in respect of gas supplied by the undertakers shall be 14d. per therm.

For the purpose of ascertaining the authorized rate of dividend, any price charged per 1000 c.ft. before the declared date shall be rendered into the equivalent price per therm by dividing it by four-and-two-fifths.

After the declared date, "therm" shall be substituted for "1000 c.ft." wherever occurring in paragraph (10) of section 41 (for protection of Knottingley Urban District Council) of the Knottingley Gas Order, 1912.

Prepayment meter clauses are included. (June 14.)

Mid-Kent Gas Light and Coke Company.

After the declared date, the standard price in respect of gas supplied by the undertakers shall be 16d. per therm.

For the purpose of ascertaining the authorized rate of dividend, any price charged per 1000 c.ft. before the declared date shall be rendered into the equivalent price per therm by dividing it by four-and-one-half. (June 16.)

Wimborne Minster Gas and Coal Company, Ltd.

After the declared date, the standard price in respect of gas supplied by the undertakers shall be 12·8d. per therm.

For the purpose of ascertaining the authorized rate of dividend, any price charged per 1000 c.ft. before the declared date shall be rendered into the equivalent price per therm by dividing it by five-and-two-fifths. (June 16.)

INCREASES IN CALORIFIC VALUE.

The following Companies having given notice of their intention to supply gas from the dates named of the increased calorific value indicated, the Gas Referees have intimated that the prescriptions in force at the present time for the respective Companies shall continue and be construed as if the higher value were substituted therein for the previously declared value.

Brighton and Hove General Gas Company.—500 B.Th.U., instead of 470 B.Th.U. (July 1.)

Gas Light and Coke Company.—500 B.Th.U., instead of 475 B.Th.U. (June 15.)

Ilford Gas Company.—500 B.Th.U., instead of 450 B.Th.U. (June 15.)

Sheffield Gas Company.—500 B.Th.U., instead of 480 B.Th.U. (July 1.)

South Metropolitan Gas Company.—560 B.Th.U. instead of 550 B.Th.U. (June 17.)

Tottenham District Light, Heat, and Power Company.—500 B.Th.U., instead of 450 B.Th.U. (June 30.)

GAS UNDERTAKINGS AND PLUMBERS.

Proposed Revision of Scheme at Blackburn.

It appears likely that an experimental agreement entered into by the Blackburn Corporation Gas Committee in 1915 with the Master Plumbers of the district, will be shortly revised. This course was indicated by the Chairman of the Gas Committee (Mr. E. Hamer, J.P.), in a statement to the Town Council at their June meeting.

In pre-war days the Gas Department followed the practice adopted by many authorities of employing their own staff to instal apparatus required by the general public. In 1915, however, the late Mr. A. Morton Fyffe (then the Gas Engineer), in taking energetic measures to popularize the use of gas, established a showroom on modern lines; and in order to secure the co-operation of the master plumbers, he entered into an agreement under which the Corporation supplied the particular gas-fitting required by the consumer, but requested the consumer to employ his own plumber for installation purposes, and further allowed a commission of 10 p.ct. to the plumber on the price of the fire or other apparatus, as quoted to the consumer. In those days the amount derived by the plumber was relatively small, for the apparatus installed was cheap and the commission negligible. In these later days, however, the cost of such apparatus has greatly increased, with the result that the commission paid is much larger.

"It is not so much the commission that concerns me," remarked a member of the Gas Committee to our representative, "as the general principle. The custom has caused much resentment on the part of the consumers; and I am afraid the Corporation will be compelled to take action to re-establish confidence. The public naturally claim that, if the Corporation can afford to allow a 10 p.ct. commission to plumbers, they can well afford to make this reduction in the price of their apparatus; and it will not be until we get rid of this suspicion that gas will come into its own. It is a very sore point. There are many plumbers who do not perform a moment's work, and who yet derive an advantage from the labour and expense of other people. Take the recent gas exhibition. This resulted in a considerable number of appliances being ordered by the general public, who were called upon to select their own plumber to make the necessary installations. The plumber was paid by the Corporation for his work, *plus* a commission on the apparatus installed, which is, on the face of it, very unreasonable. The exhibition was organized and financed by the ratepayers, in conjunction with the manufacturers of the various gas appliances; and why the plumbers should come in for benefit, no one has yet been able to satisfactorily explain."

Our representative learns that the Corporation are covered in the agreement by a clause which states that the new arrangements "are to be carried out for the time being." Thus it is within the power of the Gas Committee to terminate the practice at any time they desire. Many of the larger Lancashire corporations do their own fixing, and supply their own apparatus; and it is not improbable that the Blackburn authority will revert to this practice. It is well known that the late Mr. Fyffe was keenly anxious to popularize the use of appliances of different kinds; and there is no doubt that in 1915 the conditions were such as to warrant some agreement of this kind. But with changing values, the necessity for such terms has long since ceased to exist. In any event, the confidence of the public is necessary if the department is to continue to expand; and the Gas Committee feel that anything which hinders or interferes with that growth must be tackled fearlessly, and without favour to anyone.

Even when the apparatus is installed, it has to be examined by the Corporation inspectors, with the result there is duplication of work. The prevailing view is that, if the Committee revert to the old custom of installing appliances on their own account, there will be a cheapening of cost, a lessening of delay, the stimulation of a greater confidence, and consequently an increased demand for gas—a desirable state of things having regard to the great cost incurred by the Corporation in the recent extensions to the Greenbank Gas-Works. At present, the consumer is called upon to pay £1 installation charge up to 25 ft. of piping, and 9d. per ft. beyond that, as against 10s. and 4d. per ft., with tap and union, before 1915.

It should be explained that the plumbers' agreement only affects gas fires, geysers, and wash-boilers; but these are the appliances which the Corporation are seeking to popularize. The installation of cookers, &c., is still done solely by the Corporation.

NOTTINGHAM GAS PROFITS.

General gratification was expressed at a meeting of the Nottingham City Council, on Monday of last week, at the eminently satisfactory results attending the past year's working of the gas undertaking, which, as on previous annual occasions, has resulted in a large profit [*ante*, p. 637]. Criticism which, from the point of view of gas consumers, has been levelled against the somewhat inequitable nature of municipal financial arrangements involved in the making of large profits was moderated upon this occasion by the decision to reduce the charge for gas supplied through ordinary meters by 6d. per 1000 c.ft., while a rebate of 1d. in the shilling is to be given to prepayment customers, such reductions to come into operation from the date of the reading of ordinary meters for the Midsummer quarter and the collection from prepayment meters from July 1. The revised scale of charges for gas supplied for all purposes other than for power, "gassing" (this being a term applicable to a special process in the textile industry), and motor vehicles, and through prepayment meters, gives the following figures: If consumption be under 1,000,000 c.ft. per quarter, 4s. per 1000 c.ft.; if 1,000,000 and under 4,000,000 c.ft. per quarter, 3s. 11d.; if 4,000,000 c.ft. and upwards per quarter, 3s. 10d. For power purposes, the charges are to be 3s. 5d. per 1000 c.ft. if the consumption be under 100,000 c.ft.; 3s. 4d., if 100,000 and under 200,000 c.ft.; 3s. 3d., if 200,000 and under 300,000 c.ft.; and 3s. 2d., if 300,000 c.ft. or over per quarter. For "gassing," the charge for any quantity consumed is to be 3s. 6d. per 1000 c.ft. For motor vehicles supplied at Corporation works, with a minimum charge of 1s., the amount will be 4s. 6d. per 1000 c.ft.; and supplied to garage, for re-sale (subject to payment for special meter, services, &c.), 3s. 10d. The charge for gas supplied through prepayment meters is at the rate of 1d. for every 16 c.ft. of gas consumed (5s. 2½d. per 1000 c.ft.) less 1d. in the shilling rebate. The charge for gas supplied in the extra municipal districts of Stoke Bardolph, Burton Joyce, Linby, Selston, Underwood, and Cotgrove will be 6d. per 1000 c.ft. in excess of the charges set out in the general schedule.

The report gave rise to little discussion, other than regarding gas-stove charges, as to which Mr. A. Judd suggested the necessity of a reduction. Alderman Ball said the Committee would be willing to give the matter consideration. He wanted people, however, to understand that stoves were costing three times as much as in pre-war days.

On the subject of street lighting, Alderman Ball moved that a resolution passed by the Council in December last, instructing the Committee to revert to the pre-war system of lighting lamps to the full extent throughout Nottingham, should be rescinded, and that in lieu thereof the lighting of the lamps should be left to the Gas Committee to deal with—the lighting during the months of June and July to be meanwhile suspended. He explained that the total costs involved in lighting the public lamps in these two months had hitherto been £3112, which was equivalent to nearly a penny rate. He thought if the resolution was carried, they ought to try to find work for the men thrown out of employment. Ultimately, both a resolution for rescinding the former decision and an amendment for restoring the full street illumination, except in June and July, were withdrawn, upon the understanding that notices to the men shall be withdrawn, and that they shall be employed during the two months in painting the lamps. Mr. Green, who is a labour representative, undertook to use his influence with the Building Trade Council to see that there is no objection upon the part of the painters' section to the men being so employed.

British Dyestuffs Corporation Loss.—The report of the British Dyestuffs Corporation for the year ended Oct. 31, 1921, is, says the "Financial Times," now issued, and shows, after providing £467,106 for depreciation and crediting an estimated amount recoverable in respect of excess profits duty, a profit of £437,684. The sum of £1,444,344 is written off stock values to reduce them to current market price, leaving a net loss of £1,006,660. Deducting from this £203,305 brought in, there remains a debit balance to be carried forward of £803,355. For the previous year there was an available balance of £610,927, which included £58,827 brought forward. The full dividends were paid on the preference and preferred ordinary shares; and the balance of £203,305 was carried forward.

UNVEILING OF THE GAS LIGHT AND COKE COMPANY'S WAR MEMORIAL AT BECKTON.

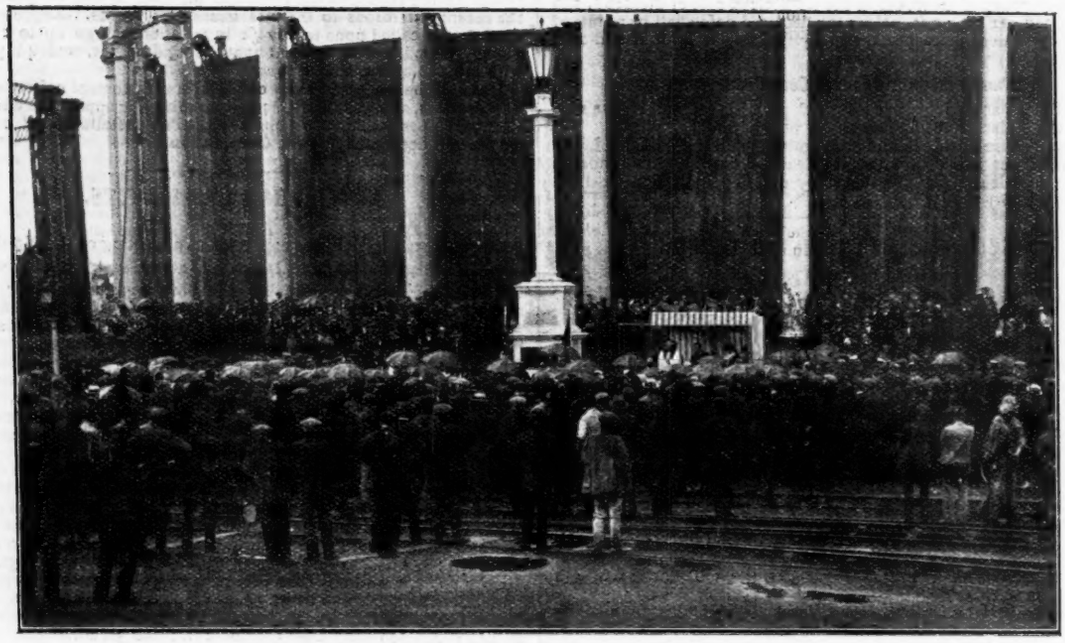
On Tuesday, the 13th inst., Mr. D. Milne Watson, the Governor of the Gas Light and Coke Company, unveiled the monument which has just been erected at Beckton, in memory of the Company's employees at those works who fell during the great war. Among those present were Mr. Thos. Goulden, Director, Mr. Thos. Hardie, Chief Engineer, Messrs. W. B. Leech, Resident, and E. J. Hutchence, Deputy Resident, Engineers, Beckton, and the Secretary and Assistant Manager of the Company.

The memorial, which has been erected in Portland stone, takes the form of a column crowned by a bronze lamp. To the plinth of the column is attached a bronze tablet with the figure of St. George, and bearing the names of the fallen. The tablet was designed by Mr. A. C. Carter and Miss Gillian Tanner, and the column and lamp by Mr. A. C. Carter.

The service, which was unfortunately marred by heavy rain, was conducted by the Rev. Canon R. W. Porter, Vicar of East Ham, and the Rev. J. Living-Taylor, Baptist Minister of Barking, and was attended by the relatives of the fallen and a large number of the Company's workmen and staff.

In unveiling the tablet, the Governor stated that no less than 5000 men belonging to the Company had answered their country's call; and of these 500 had fallen. Of the latter, 97 came from Beckton itself. Not merely were their names recorded on the bronze tablet, but their memory was kept green by the Company's War Memorial Fund, to which the Company's staff, workmen, and shareholders had all contributed, and which was designed in the first place to relieve cases of distress due to the war.

At the conclusion of the ceremony, the Governor, on behalf of himself and his fellow Directors, placed a wreath at the base of the memorial.



THE UNVEILING CEREMONY AT BECKTON.

EXTENSIONS AT THE BURTON GAS-WORKS.

Following an application by the Burton-on-Trent Town Council to the Ministry of Health for sanction to borrow £8500 for the purpose of their new gas-works, Mr. H. R. Hooper held an inquiry on Thursday last.

An objection on the grounds that the request for tenders had not been publicly advertised was made by Mr. G. Adams, who stated that only private invitations were extended to three or four firms. The Inspector said that, so far as he understood it, the direction for a local authority to advertise for tenders was not mandatory. It was usual to advertise; but it was not a legal necessity. The Town Clerk (Mr. J. B. Chapman) pointed out that, as Mr. Adams knew, the Corporation did not think it necessary to advertise for tenders; but individual firms were approached.

Proceeding, the Town Clerk explained to the Inspector that the new works were required with a view to the more efficient and economical carrying out of the purification of the gas. The Manager (Mr. W. Wilson) said similar purifiers to those now in question had been erected at Tottenham, and had given the utmost satisfaction.

After a discussion on the financial position of the undertaking, the inquiry closed.

OLDBURY GAS UNDERTAKING.

Annual Statement.

The statement of accounts for the year ended March 31 in connection with the Oldbury Gas-Works has just been issued by the Engineer and Manager (Mr. C. H. Carder), and the Accountant (Mr. J. Butlin).

In the revenue account it shows that the manufacture of gas cost £28,904; distribution, £4446; lighting of public lamps, £865; rents, rates, and taxes, £4294; management, £1003; loss on sale of Consols, £312; and insurance, £193—making a total expenditure of £40,019. On the receipts side, sales of gas realized £35,786, including £14,621 from prepayment meters, £11,643 from ordinary consumers, and £9522 from power users. Public lighting realized £1455; and the discounts and allowances brought the receipts to £36,598. Residual products realized £7850, and other receipts totalled £555, leaving a gross profit of £4985. The profit and loss account showed a net profit of £48 for the year.

The working statement revealed that 9276 tons of coal were carbonized; the gas made being 164,458,000 c.ft. and the coal gas made per ton of coal 12,175 c.ft. The gas sold and used on the works was 142,056,200 c.ft., showing that 22,344,800 c ft. was unaccounted for. The total gas sent out of the works was 164,403,000 c.ft., a decrease of 18,039,000 c.ft.

It was recommended at a meeting of the Council that the annual statement of accounts should be approved and adopted; and this was agreed to. Mr. Chance (the Chairman of the Gas Committee), in presenting the accounts, said it had been a most difficult year. They would remember at the beginning of the financial year they had the coal stoppage looming in front of them; and this went on for a longer period than they could possibly have anticipated. He would like to say it was only due to the Gas Manager—who had as good information of that as anyone he knew, and had warned them beforehand about the stoppage—that they came out so well as they did; and Mr. Carder was heartily to be congratulated on the way he pulled through, without having to cut-down the gas supply at all. The capital value of the undertaking was now reduced to £49,110; and anybody who knew what the undertaking included, apart from the works, would agree that this was a low valuation. On capital account, the new housing scheme had involved an expenditure of £2263 on meters, mains, service-pipes, &c., including laying; and that had been met without having to borrow a penny for the purpose. On revenue account he pointed out there was a heavy discrepancy between receipts, as against the previous year. The rates and taxes last year equalled 7¼d. per 1000 c.ft. of gas made. The charge for gas was very much less, and the net profit was less; and in regard to this he said frankly he did not think an undertaking of that nature could afford to make a profit when the taxes were something like 5s. or 6s. in the pound.

It may be pointed out that the slump in trade generally during the past year has naturally been severely felt in an industrial district such as this, not only by reduction of consumption for manufacturing purposes by practically one-half, but also by reduced purchasing power of the workers; and that the department have have been able, despite this handicap, to reduce the price of gas four times since September last (lighting from 5s. 6d. to 4s. 3·3d., power from 4s. 8d. to 3s. 5·8d. per 1000 c.ft.) speaks well for the administration. A reduction in the yield of coal gas per ton from 14,074 to 12,175 c.ft. was due to the use until October last of slacks in place of ordinary gas coal, and was abundantly justified by the much lower price at which slacks were obtained.

At the same meeting, the proposals of the Gas Committee for a comprehensive scheme of reconstruction were also approved; and in submitting a resolution for the acceptance of a tender for a Glover-

West vertical retort installation to make 1 million c.ft. per day on straight coal gas, Mr. Chance said that this was substantially the same scheme as was brought forward by the Engineer two years ago, but postponed for financial reasons. Prices now, however, were very much lower—in fact, the cost per unit of output was actually lower than pre-war. Reconstruction was urgently needed, and it would only be with difficulty that the works would carry on until it was done.

RAILWAY ELECTRIFICATION AND THE SOUTH METROPOLITAN GAS COMPANY.

The South Metropolitan Gas Company appeared before the Electricity Commissioners on Wednesday last as objectors to the proposal of the Managing Committee of the South-Eastern and Chatham Railway for the erection of an electric power station for supplying power in connection with the electrification of their lines. The matter has been the subject of a public inquiry by the Commissioners since May 30; there having been considerable opposition by the electric supply interests in London, various existing electricity supply companies being desirous of meeting the needs of the Railway Company. The position of the South Metropolitan Gas Company, however, is quite distinct.

Earlier in the proceedings, Mr. SEAGER BERRY (Messrs. Sherwood & Co., Parliamentary Agents) had raised the question of protection for the Gas Company's mains in connection with the electrification scheme; but on its being pointed out that the application now being considered related only to the erection of a generating station, and that any question of the protection of mains did not arise, this matter was not further proceeded with. The case subsequently put forward by Mr. Berry, however, was against permission being given to the Railway Company to erect a power station, on the grounds of competition; the principal point being that the application made to the Commissioners was out of order on a technical point.

Mr. BERRY said that, under the Electricity Supply Bill now pending, a railway company owning a generating station could sell its surplus power to an authorized undertaker. He took no exception to this because although it facilitated competition with the gas companies, it was a form of competition which Parliament had authorized frequently. His real point, however, was that a considerable portion of the South Metropolitan Gas Company's area included the lines of the Managing Committee of the South-Eastern and Chatham Railway, and gas was supplied to the railway stations and other premises to the extent of £18,000 per annum. If the Railway Company were given authority to erect their own generating station, no doubt they would claim the right to supply not only the trains and the lighting of the carriages, but also the railway stations and other premises of which they were lessee, and so compete with the Gas Company. On the other hand, if the supply were taken from an outside authority which was not the authorized distributor of the area, as would be the case here, then the electricity could only be used for operating the trains and lighting the carriages, and not for lighting railway stations and other premises, unless a Special Order was obtained under the Electricity Supply Act of 1919. Thus the ability of the Railway Company to compete with the Gas Company was greater if they had their own power station than if they took their power from an outside source. Moreover, if the Railway Company had their own power station, and could pick and choose which of their premises they would supply, they could pick the good ones, and leave the bad ones to the Gas Company, which the latter would be bound to supply.

Sir JOHN SNELL, the Chief Commissioner, said that if the Electricity Bill now before Parliament were passed, the railway companies would be more restricted in this respect than they were now, because under the Bill they could not supply in the area of an authorized distributor without the consent of that distributor.

Mr. BERRY said that in a sense that was so under the 1909 Act; but he was inclined to think that if the Railway Company got the power to erect a generating station of their own, they would claim that they were entitled to supply their surplus energy for lighting their railway stations and any premises of which they were lessee, even if the premises were within the area of an authorized distributor.

Mr. TYLDESLEY JONES, K.C., who appeared for the West Kent Electric Company said this point had been raised some years ago; but it was not fought out.

Mr. BERRY held that this did not affect the argument that a railway company could not do that if they took the supply from an outside source. Moreover, he pointed out to the Commissioners that the Railway Company in this case were seeking to erect a generating station with the assistance of a Government guarantee under the Trade Facilities Act, on the credit of the taxpayer, and the South Metropolitan Gas Company would have the pleasure, as a taxpayer, of making their small contribution to the guarantee. Finally, Mr. Berry made the point to the Commissioners that the application made by the Managing Committee of the South-Eastern and Chatham Railway was out of order, for the reason that any application made, as this was, under section 11 of the Electricity Supply Act of 1919 must be by the authority, company, or person intending to erect the generating station; whereas the Managing Committee would not be the authority to erect the power station if consent were given, as they would be incorporated, with 15 other railway companies, in the southern group under the Railways Act of 1921, and would be out of existence long before the generating station was built. The applicant the Commissioners must have before them, he contended, under the terms of section 11 of the Electricity Supply Act of 1919, was the applicant who was to erect the station, and this was not the case here.

Sir HARRY HAWARD (a Commissioner): Do you suggest that the application is not in order?

Mr. BERRY: Certainly it is not in order.

Sir HARRY HAWARD: Then your objection should have been taken some days ago.

Mr. BERRY said his point was that the Commissioners had not got before them the body who would do the work.

Sir JOHN SNELL: I understand you to say that because the application is addressed to us on behalf of the Managing Committee it is not an application by the Railway Company to construct this station.

Mr. BERRY agreed that it was an application on behalf of the Railway Company; but any consent would be invalid, because the Company were to be incorporated with 15 others into another company, and there was no evidence that the new company, when formed under the grouping system, would agree to what the Managing Committee were now asking consent to.

Sir JOHN SNELL said that surely the power would be transferred to the new company when formed. According to the argument put forward, nothing could be done until the group was actually formed. No doubt Counsel for the Railway Company would deal with the point.

Mr. BERRY said he was relying simply on the wording of the section; and he could not imagine how Counsel could deal with it.

Sir HARRY HAWARD (to Mr. Berry): You represent an important Company. What is it the South Metropolitan Gas Company ask the Commissioners to do?

Mr. BERRY said they asked the Commissioners not to consent to the erection of a power station by the Railway Company.

Sir HARRY HAWARD: Because in their opinion it is technically not in order, and, secondly, if we sanctioned the erection of a power station by the Railway Company, or unless we put some condition upon them, they would compete in a certain limited way with the South Metropolitan Gas Company. Is that true?

Mr. BERRY said it was because the South Metropolitan Company did not want the competition of the Railway Company, and he was entitled to point out to the Commissioners any reason which would enable the Gas Company to escape that undesirable thing, from their point of view. It might be that the Acts of Parliament had got things into a tangle; but that was not his fault.

This concluded the case for the South Metropolitan Gas Company.

CARRIAGE OF COAL-TAR PRODUCTS.

A meeting of the Rates Advisory Committee has lately been held—under the chairmanship of Sir Francis Gore-Brown—to consider objections lodged by traders in regard to the proposed classification by the railway companies of "dangerous goods." One of the objections had reference to benzole, &c.

Mr. LUKES said the railway companies proposed a difference of one class for 3 tons per truck, Class 16. The traders did not think this was a sufficient reduction; and their proposal of three classes was most modest. He pressed for Class 14 for 3-ton trucks.

The decision of the Committee was that benzole in cans or drums of 10 gallons should be in class 17, 3 tons per truck in Class 15, owners' tank-wagons 8 tons Class 14, and 12 tons Class 13.

With regard to coal-tar naphtha, Mr. PIKE (for the railway companies) said that, in view of what had been previously decided, the railway companies were prepared to accept Class 16 for any quantity, Class 14 for 3 tons, and Class 13 for owners' tank-wagons in 8-ton lots. This was agreed to by the traders.

The next objection was in regard to xylol, Class B. It was urged that this should be classified the same as coal-tar naphtha. The Committee eventually decided that xylol Class B should be the same rate as in Class A.

Mr. LUKES supported the objection in regard to pyridine base, and said the present classification was Class 1, S to S. The railway companies proposed Class 16; and the traders asked for Class 8 for 8 ton tanks, Class 7 for 12-ton tanks, and Class 16 for 14-ton tanks. The Committee decided it should go in Class 8.

The proposal of the railway companies to put phenol into Class 13 was objected to by the traders; but the Committee thought it should remain in this class.

Mr. LUKES supported the objection in regard to spent oxide of iron, and said at present it was in Class A, S to S, company's risk. The traffic competed with imported iron pyrites from Spain. The conveyance of spent oxide of iron was not altogether a business proposition.

Mr. PIKE said this was used in the production of sulphuric acid, and took the place of iron pyrites, which had been in Class 1; but there was no comparison between the two things when it came to a question of risk. Some 24 p.ct. of the fires among miscellaneous dangerous goods reported to the companies were due to spent oxide of iron. The Committee decided that Class 2 was the proper one.

Gas-Mantle Company's Failure.

At the offices of the Board of Trade, Carey Street, W.C., on Monday of last week, statutory meetings were held in the matter of the Richmond Light Manufacturing Company, Ltd., of No. 90, Cannon Street. The statement of affairs showed gross liabilities £3629 13s. 10d., of which £1737 14s. 6d. was expected to rank. After allowing for preferential claims, the assets were returned at £1730 13s., which were all absorbed by debenture holders' claims amounting to £1849 9s. As regards contributories, the paid-up capital was £1785; and the total deficiency amounted to £3641 10s. 6d. The winding-up order was made on July 26 last. Mr. J. B. Thompson (Official Receiver) presided, and reported that so far as he could judge there would be nothing for the unsecured creditors. The Company was formed for the purpose of manufacturing incandescent mantles, burners, and electric lighting appliances, and was registered as a private company in December, 1919, with a nominal capital of £2150, divided into 2000 preference shares of £1 each, and 3000 ordinary shares of 1s. each. The business was confined to the manufacture and sale of gas-mantles. In February, 1921, owing to loss incurred in trading, the Company were advised to discontinue the manufacture of mantles and to close their works; but instead of doing this, negotiations were commenced with another company with a view to the latter taking over the stock and plant. An agreement was entered into for the other firm to manufacture on behalf of the Company; and the stock, plant, and machinery was transferred. The reasons for the failure of the Company, as stated by the Directors, were heavy overhead charges and foreign competition.

GLOVER-WEST VERTICAL RETORTS.

Extensions at Leicester.

The Leicester Town Council have authorized the acceptance of the tender of West's Gas Improvement Company for an extension of the Glover-West vertical retorts at the Aylestone Road Gas-Works, to take the form of an installation to be erected in the coal-store adjoining No. 2 retort-house.

The new plant is to be of the latest Glover-West steaming retort design, and equipped with waste-heat boilers. It will be complete with extensive coal storing and handling plant, coke screens and storage bunkers in ferro-concrete, and a system of telpherage for storing coke in the yard—the whole being arranged for future extension.

The capacity will be 3½ million c.ft. of gas per day, which will bring the total vertical retort capacity on these works up to 6 millions per day, and, together with those at the Belgrave Gate Works, will make the total capacity of Glover-West vertical retorts installed by the Leicester gas undertaking over 10 million c.ft. per day.

CAMBUSLANG GAS COMPANY, LTD.

Manager Who Did His own Firing.—Early Appreciation of Vertical Retorts.

To all intents and purposes, the above Company came to an end last week, when the final surplus of assets was distributed among the various shareholders—constituting a not unpleasant return. The concern was taken over by the Middle Ward of Lanarkshire District Committee about a year ago; and the Committee lately announced a decrease of 5d. in the price of gas.

The old Company, eminently successful always, made history in the fact that it was the second in Scotland to introduce vertical retorts—Helensburgh being first. The Company's first Manager did his own firing; but a lot of water has gone under the bridges since then, and now the undertaking is among the most successful and progressive in Lanarkshire. A number of men famous in Glasgow and the West of Scotland acted as Chairman from time to time.

"NATIONAL BENZOLE MIXTURE."

In the issue of the "JOURNAL" for May 24, preliminary details were given of an important development in regard to British motor spirit enterprise; the Directors of the National Benzole Company having concluded a working agreement with the Agwi Petroleum Corporation which ensures a supply of British controlled petrol of a grade stated to be higher than the average quality. In future, therefore, "National Benzole Mixture" will be marketed. This will be a "fifty-fifty" mixture of benzole and petrol—both fuels being produced to a standard quality, in the same way as "National Benzole" has been produced in the past. During a luncheon at the London Country Club, Hendon, on Tuesday of last week, some of the points already made were emphasized, and further details of this interesting development were given by Mr. S. Henshaw F.I.C. (the Chairman of the National Benzole Company, Ltd.) and Sir Joseph Davies, K.B.E., M.P. (the Chairman of the Agwi Petroleum Corporation, Ltd.).

ADVANTAGES OF THE NEW FUEL.

In spite of many tempting offers by the oil trusts to absorb them, the National Benzole Company have maintained their independence, and by the recent partnership with the Agwi Corporation have considerably strengthened their organization as producers and distributors of home-produced motor spirit. Various misleading statements having been published, it has been found necessary to emphasize the fact that the mixture is half British benzole, and half a super-grade British-refined No. 1 grade petrol. It requires, remarked Mr. Henshaw, no expert in fuel matters to appreciate what such a fuel means to users of motor spirit. The value of an admixture of benzole is freely appreciated; and a percentage such as this stamps the new fuel as in a category by itself. Another feature is the scientific blending of the two fuels, which is quite different from the mere mixing in the tank by pouring-in a tin of each. The latter method is naturally not so satisfactory as the more scientific mixing now adopted. The distributing facilities have been considerably extended during the last twelve months; and further developments are being made almost daily, with the object of giving an efficient distribution of "National Benzole Mixture."

The claims made on behalf of this new fuel are very sweeping; but it is confidently asserted that the motorist is justified in anticipating their realization in practice. For example, the claim to increased mileage is obviously well covered in theory; and nothing can prevent that increased mileage being obtained in practice. It is the same with the claims for better hill-climbing, absence of pinking, smoother running, and so on. All are said to be thoroughly justified—a practical test will readily prove the matter.

The new fifty-fifty "National Benzole Mixture" is stated to be the only motor spirit on the market containing a guaranteed percentage of benzole; and it is to be sold at the same price as No. 1 motor spirit.

It was further pointed out by Mr. Henshaw that "National Benzole" has during the past few years been recognized as a most powerful and efficient motor spirit; the one drawback to its general adoption being the shortage of production, which in the best year of industrial activity since 1919 only amounted to approximately 20,000,000 gallons. The obvious result was that the motorist could not always obtain his quota of benzole, and became very dissatisfied—blaming the distribution organization for inefficiency in supplying his requirements. In effect, the distribution facilities of the Company quickly outgrew the benzole production; and it became apparent that as there was so little prospect of the production of benzole increasing to meet the demand, they should secure a partner with a guaranteed supply of British-refined spirit to allow the expansion of distribution, which it is intended will ultimately serve every village in the British Isles. Almost every motorist has been obliged in the past to mix benzole he has been able to obtain with petrol; and the percentage of the mixture has varied according to the benzole available. This circumstance, though very irksome, has enabled all classes of users of motor spirit to appreciate the useful properties of benzole. Fortunately, industry generally is becoming more active; but though the production of benzole is increasing, the demand for the available supply is so great that it will be impossible—unless some very large unforeseen development takes place—for the motorist to depend entirely on benzole for his future requirements. This forecast of the future prompted the National Benzole Company to secure an association with a guaranteed independent production of spirit—such as the benzole producers of the British Isles have in "National Benzole."

THE BRITISH PRODUCED PETROL.

That arrangements on a very complete scale indeed have been made by the Agwi Petroleum Corporation to carry out their share of the partnership was made clear by Sir Joseph Davies. In the first place they have made an agreement with their American Associated Company, who guarantee all necessary supplies of crude petroleum from their Mexican properties; while in the matter of tanker tonnage, a fleet of 150,000 tons capacity is at the service of the Corporation. On this side of the Atlantic, they claim to own one of the finest sites in the world. This freehold site covers a square mile, with a frontage to Southampton Water over a mile in length; and on it they have constructed a refinery which is now refining 1000 tons of crude oil a week. Next September, this capacity will be trebled. For storage, there have been erected a large number of steel tanks with varying capacities; the largest holding 8000 tons. The total tankage now completed is sufficient to store about 20,000,000 gallons of oil. At their refinery the Corporation are operating the process invented by Sir Oliver Lodge and Dr. Tinker. They have now tested this process on a large throughput over an unbroken period of months; and know beyond question that it works with complete success. It is said to give two vitally important and valuable results—first, it produces from Mexican crude a petrol of the highest possible quality that will compete with petrol produced from any crude in the world; and, secondly, it is producing from the crude oil from 40 to 50 p.ct. more petrol than is produced by the ordinary processes now worked in the refining of similar crude.

The Corporation hope that one effect of the arrangements completed between the National Benzole Company and themselves will be to encourage more and more the production of benzole at coke-ovens and gas-works in the country; and as the benzole output grows, they can extend their works at Southampton. They have looked forward in this respect, and the area of land, shipping facilities, and general lay-out have been designed for eventually increasing the plant to handle 25,000 tons of crude petroleum per week.

New Inverted Incandescent Gas Lamp Company.—The profit of the Company for the year ended March 31, after allowing for depreciation and all trade charges, was £9152. The balance available is £2155, *plus* £10,933 brought forward, making £13,089. The Directors recommend a dividend of 3 p.ct., free of tax, carrying forward £9841.

James Keith and Blackman Company.—The net profit of the Company for the year to March 31, after providing for debenture interest, depreciation, and reserves against doubtful debts, was £20,481, *plus* £12,575 brought in, making £33,056. The Directors recommend a dividend on the ordinary shares of 7½ p.ct., free of tax, carrying forward £15,944.

The Therm Basis at Bath.—The Directors of the Bath Gas Light and Coke Company have decided to commence working under the Bath Gas (Charges) Order, 1922, from the date of reading the meters for the June quarter. The declared value is 480 B.Th.U., and the price to be charged 6·6d. per therm, which is equal to 2s. 7·68d. per 1000 c.ft. The price of gas was recently reduced from 2s. 10d. to 2s. 8d. per 1000 c.ft.

Paris Gas Company.—At the recent meeting of the Company, the same dividend of 10 frs. per share was declared as in the preceding year. An instalment of 5 frs. on the dividend having been paid last January, the balance will be distributed to shareholders on July 1. The increase of receipts from the sale of gas was 49,500,000 frs., or 23·88 p.ct., due to the raising of the price per cubic metre of gas to 55 c. The falling off of the receipts from coke amounted to 83,200,000 frs. compared with 1920.

A Further Reduction at Ormskirk.—The Directors of the Ormskirk and District Gas and Electricity Company, on the recommendation of their Engineer and Manager (Mr. W. M. Carr), have decided to reduce the price of gas by 6d. per 1000 c.ft. from the end of the current quarter. This follows upon a reduction of 6d. per 1000 c.ft., which came into force on April 1—making a total reduction of 1s. within a period of two quarters. The price of gas to ordinary consumers, with the latest reduction, will be 4s. 3d. net per 1000 c.ft., and to power gas users, for any manufacturing processes, from 3s. 9d. to 2s. 2d. per 1000 c.ft., according to the quantity consumed.

An Improving Position at Uckfield.—At the sixty-fourth ordinary meeting of the Uckfield Gas Company, a letter was read from the Chairman (Mr. S. S. Avis), who apologized for absence through ill-health, and stated that it was the first meeting he had missed in fifty years. The balance-sheet revealed an improving position. The report of the Directors, which was adopted, stated that the revenue for gas supplied, rents of meters, &c., had amounted to £4995, as against £3825 in the previous year. The outlay for coal had been £2825, as compared with £3255. The balance of the appropriation account, including the balance of the revenue account, was £2063. The Directors recommended payment of a dividend at the rate of 5s. per share, less income-tax. This would absorb £450; and the balance of £1613 14s. 5d. would be carried forward.

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

LONDON, *June* 19.

There is very little of interest to report in the London tar products market. The export of pitch is practically over for this season; but it would appear that further supplies are still wanted on the Continent. Makers are not anxious to make any more sales of pitch at present for shipment next half year, in consequence of the very strong position on this side. Large deliveries of tar and tar materials for the roads are being made. Creosote also is firm, the price being about 6¼d. per gallon, net and in bulk at makers' works. Other products are without change.

Tar Products in the Provinces.

June 19.

The market for tar products has been very steady throughout the past week. There has been considerable inquiry for pitch and creosote, and business is reported at improved prices both for prompt and forward position. Solvent naphtha is quiet, though there has been a little more inquiry. Other products remain about the same.

The average values for gas-works products during last week were: Gas-works coal tar, 38s. 3d. to 43s. 3d. Pitch, East Coast, 70s. to 72s. 6d. f.o.b. West Coast—Manchester, 65s. to 67s. 6d.; Liverpool, 65s. to 67s. 6d.; Clyde, 67s. 6d. to 68s. 6d. Benzole 90 p.ct. North, 2s. to 2s. 1d.; crude 65 p.ct. at 120° C., 1s. 3d. to 1s. 5d. naked at makers' works; 50-90 p.ct., naked, North, 2s. to 2s. 1d. Toluole, naked, North, 2s. 2d. to 2s. 5d. nominal. Coal tar crude naphtha in bulk, North, 9d. to 10d. Solvent naphtha, naked, North, 1s. 10d. to 2s. Heavy naphtha, North, 2s. 1d. to 2s. 3d. Creosote, in bulk, North, liquid, 4⅜d. to 5d.; salty, 4⅜d. to 4½d. Scotland, 4d. to 4⅜d. Heavy oils, in bulk, North, 6d. to 6½d. Carbolic acid, 60 p.ct., 2s. to 2s. 1d. Naphthalene, £12 to £15; salts, £5 to £5 10s., bags included. Anthracene, "A" quality, 5d. to 6d. per minimum 40 p.ct.; "B" unsaleable.

FROM A MARKET CORRESPONDENT.

Bye-Products Trade.

There are signs of general improvement in the bye-products trade; the settlement of the engineering trouble being one of the chief factors in bringing this about. The position of pitch has become strong, inquiries coming in from all parts. There is a good demand for pitch for early deliveries, and also during July and August. Latest values are between 65s. and 75s. per ton; the latter figure being the price which South Wales consumers are prepared to pay. There is very little shipping, but the road-making demand is as good as ever. Solvent naphtha has developed strength, and the price has risen to 2s. 3d. per gallon. There is at present only a small production, but not nearly enough for the market requirements if there should be a strong demand for it. Naphthalenes are quiet; and the firelighter trade is not taking much crude lately. Creosote is a stronger market, and has improved to 5½d. to 6d. per gallon. Cresylic acid, on the other hand, is rather more pressed for sale, and prices are lower—pale 97-99 at 2s. 2d. and dark 95-97 at 1s. 10d. per gallon. Very little crude carbolic acid is being made; and for the small quantity available, 1s. 10d. per gallon is about the price. Crystals are roughly 6d. per lb. In intermediate products business has remained quiet, but with rather more business on export account, without any change in quotations.

Sulphate of Ammonia.

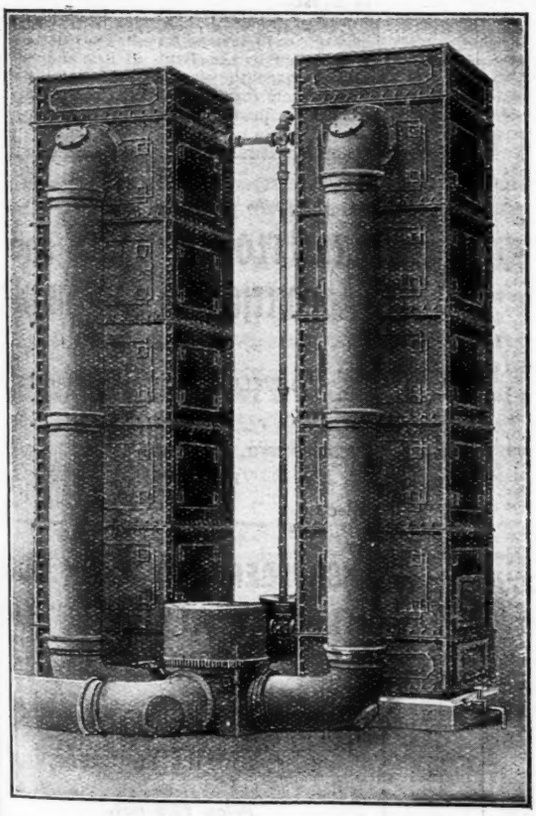
Business in sulphate of ammonia is quiet, the market awaiting quotations for next season's trade. With the engineering dispute over, prospects are much brighter in the iron and steel trades, and greater activity may be looked for among coke-ovens, with a corresponding improved output of sulphate of ammonia and other bye-products. From the United States, it is reported that the new season's prices are not yet announced, but large producers are not in a hurry to make any prices, as they anticipate heavy business both on home and export account.

TRADE NOTES.

Meldrum Fuel Economy Apparatus.

The worse the times, the greater is the need for economy; and during last month (May) Messrs. Meldrums, Ltd., of Timperley, near Manchester, have received many orders for their fuel economy apparatus—including two for gas undertakings. Additional pages to the firm's recently issued forced draught furnace list show Meldrum furnaces as installed in a few of many different industries—gas-works among the number.

Irish Gas Prices.—The Bangor (co. Down) Urban District Council are reducing the price of gas, as from July 1, from 5s. to 4s. 2d. per 1000 c.ft., existing rates of discount and stove-hire to remain in force. Mr. B. Mitchell (the Gas Manager) and the officials were warmly complimented on the management of the works. At Strabane, it was announced that the Gas Manager (Mr. Rooney) recommended a reduction of 9d. per 1000 c.ft. in the priceof gas, as from July 1. The Waterford Corporation have instructed the Town Clerk to call the attention of the Minister for Economic Affairs under the Free State Provisional Government to the present price of gas in the city, which is considered exorbitant, and to request the appointment of an arbitrator to fix an amended price.



"BEARSCOT" TUBING IN WATER CONDENSERS EXTENDS UPWARDS OF 150 MILES.

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STOCK MARKET REPORT.

THE Stock Exchange opened last week in very despondent mood; all the sinister factors of the previous week being in operation, and markets in general were more or less flat. The gilt-edged lot suffered; but Home Government issues recovered later, and closed almost unchanged. Friday's figures for the big four were: Consols 55-56, War Loan 99$\frac{7}{16}$-99$\frac{9}{16}$, Funding 84$\frac{3}{4}$-85$\frac{1}{4}$, Victory 87$\frac{1}{4}$-88$\frac{3}{8}$. The welcome lowering of the Bank rate on Thursday imparted strength pretty well all round. Home Rails, which had fallen freely, looked up again, and the Foreign Market nearly regained its losses. Things in the Miscellaneous Department were variable.

Business in the Gas Market showed a good average of activity taken in the aggregate; but the dealings were largely engrossed by the London companies, which were very firm. Gas Light ordinary and South Metropolitan rose 1 each, and Gas Light preference $\frac{1}{2}$. In the Suburban and Provincial group, South Suburban debenture rose $\frac{1}{2}$, Southampton debenture 6$\frac{1}{2}$, and Wandsworth, Wimbledon, and Epsom 2 each. In the Continentals, Imperial continued very quiet and unchanged, and European was $\frac{1}{2}$ lower. Primitiva shares were rather weaker; but the 4 p.ct. debenture rose 4$\frac{1}{2}$.

The following transactions in gas during the week were recorded: On Monday, Brentford "B" 92, 92$\frac{1}{2}$, Gas Light ordinary 94$\frac{1}{2}$, 94$\frac{3}{4}$, 95$\frac{1}{2}$, ditto maximum 65, 65$\frac{1}{2}$, ditto preference 78, 79$\frac{1}{2}$, Imperial Continental 164, 164$\frac{1}{2}$, Primitiva 15s. 3d., 16s., ditto preference 40s., South Metropolitan 96$\frac{1}{2}$, 96$\frac{3}{4}$, 97$\frac{1}{8}$, Wandsworth Wimbledon 95-95$\frac{1}{2}$, ditto debenture 58, Aldershot 5 p.ct. maximum "C" 76$\frac{1}{2}$, 77, 77$\frac{1}{2}$, Swansea 7 p.ct. preference 101$\frac{1}{2}$, ditto 6$\frac{1}{2}$ p.ct. debenture 104$\frac{3}{4}$. On Tuesday, Commercial 4 p.ct. 93$\frac{3}{4}$, European 12$\frac{1}{4}$, 12$\frac{3}{8}$, 12$\frac{5}{8}$, 12$\frac{3}{4}$, Gas Light ordinary 94, 94$\frac{1}{4}$, 94$\frac{3}{8}$, 95, 95$\frac{1}{4}$, 95$\frac{3}{8}$, 95$\frac{1}{2}$, ditto debenture 64$\frac{3}{4}$, Imperial Continental 165, Primitiva preference 42s. 6d., South Metropolitan 96$\frac{1}{4}$, 96$\frac{3}{8}$, 96$\frac{3}{4}$, 96$\frac{7}{8}$, South Suburban 101$\frac{3}{4}$, ditto debenture 97, Tottenham "B" 99, 99$\frac{1}{4}$, 100, Pinner 10 p.ct. "A" 7$\frac{1}{8}$, 7$\frac{1}{4}$, ditto 7 p.ct. "B" 5$\frac{5}{8}$, 5$\frac{3}{4}$, Swansea 6$\frac{1}{2}$ p.ct. debenture 104$\frac{1}{2}$. On Wednesday, Alliance and Dublin 62$\frac{3}{16}$, Commercial 4 p.ct. 93$\frac{3}{4}$, ditto 3$\frac{1}{2}$ p.ct. 93$\frac{1}{2}$, European 12$\frac{5}{8}$, Gas Light ordinary 94, 94$\frac{1}{4}$, 94$\frac{3}{8}$, 95, 95$\frac{1}{4}$, 95$\frac{7}{16}$, 95$\frac{1}{2}$, 95$\frac{3}{4}$, ditto preference 77, Imperial Continental 163, 164$\frac{1}{2}$, 165, 165$\frac{1}{2}$, ditto debenture 78$\frac{1}{2}$, Metropolitan of Melbourne 97$\frac{1}{4}$, Oriental 95, Primitiva preference 40s, ditto debenture 75, South Metropolitan 96$\frac{5}{8}$, 96$\frac{7}{8}$, 97$\frac{1}{4}$, ditto 6$\frac{1}{2}$ p.ct. debenture 104$\frac{3}{4}$, 105$\frac{1}{8}$, 105$\frac{1}{2}$, South Suburban 100, Tottenham "B" 100, 100$\frac{1}{2}$, Barnet "C" 114$\frac{3}{4}$, 115, ditto "D" 77, 77$\frac{1}{4}$, Southgate 5 p.ct. preference 92$\frac{1}{2}$, 91. On Thursday, Bournemouth "B" 91$\frac{15}{16}$, 10, Bristol 90, Commercial 4 p.ct. 92, 93, 94, ditto 3$\frac{1}{2}$ p.ct. 93, European 12$\frac{5}{8}$, 12$\frac{1}{2}$, 12$\frac{5}{8}$, Gas Light ordinary 94$\frac{3}{4}$, 95, 95$\frac{1}{2}$, 95$\frac{5}{8}$, 96, 96$\frac{1}{4}$, 96$\frac{1}{2}$, ditto debenture 62$\frac{3}{4}$, 63, Imperial Continental 164, 164$\frac{1}{2}$, ditto debenture 79, Primitiva 14s., ditto preference 42s. 6d., ditto debenture 75, South Metropolitan 96$\frac{1}{2}$, 96$\frac{3}{4}$, 97, ditto debenture 62, South Suburban debenture 99$\frac{1}{2}$, Tottenham "A" 114$\frac{1}{4}$, 115, ditto "B" 99$\frac{1}{2}$, Croydon 5 p.ct. maximum "D" 76$\frac{3}{4}$, 77$\frac{1}{4}$, Swansea 7 p.ct. preference 102$\frac{1}{2}$. On Friday, Alliance and Dublin 62, 62$\frac{1}{2}$, Brentford "B" 93, Commercial 4 p.ct. 93, 94, European 12$\frac{5}{8}$, Gas Light ordinary 95$\frac{1}{4}$, 95$\frac{3}{8}$, 96, 96$\frac{1}{4}$, 96$\frac{1}{2}$, Primitiva preference 40s., ditto 1911 debenture 57, River Plate debenture 58, South Metropolitan 96$\frac{1}{2}$, 96$\frac{5}{8}$, 97, ditto 6$\frac{1}{2}$ p.ct. debenture 105, 105$\frac{3}{4}$, Tottenham "B" 100, Wandsworth "C" 89, Swansea 6$\frac{1}{2}$ p.ct. debenture 105$\frac{1}{4}$.

In the Money Market, rates ruled very firm in response to demand up till Thursday, when a reduction in the Bank of England rate to 3$\frac{1}{2}$ p.ct. made the position more comfortable. The 4 p.ct. rate had lasted since April 13. Discount terms were firm up to the close.

ANTE-WAR PRICES AND DIVIDENDS, LATEST DIVIDENDS, AND LAST WEEK'S BARGAINS.

Issue.	Share.	When ex-Dividend.	Ante-War Dividend & Bonus.	Last Dividend.	NAME.	Closing Prices, July 30, 1914.	Present Prices.	Lowest and Highest Prices of Bargains.
£			p.c.					
182,049	Stk.	Mch. 15	4	4%	Aldershot 4 p.c. Pref.	..	70—75	...
1,551,868	,,	Apl. 12	2$\frac{1}{2}$	3$\frac{3}{16}$%	Alliance & Dublin Ord.	59—64	62—67	62—62$\frac{1}{2}$
374,000	,,	Jan. 12	4	4%	Do. 4 p.c. Deb.	76—79	62—67	...
280,000	5	May 18	7$\frac{1}{2}$	4/—	Bombay, Ltd.	5$\frac{7}{8}$—6$\frac{1}{8}$	4$\frac{1}{8}$—5	...
100,000	5	Feb. 23	10	7$\frac{1}{2}$%	Bournemouth Gas and Water { 5 p.c.	..	10$\frac{1}{2}$—11$\frac{1}{2}$	...
383,110	10	,,	7	7%	Bournemouth Gas and Water { B 7 p.c.	15—15$\frac{1}{2}$	9—10	9$\frac{13}{16}$—10
115,000	10	,,	6	6%	Bournemouth Gas and Water { Pref. 6 p.c.	13$\frac{1}{2}$—14	8—9	...
162,065	—	Dec. 30	—	4%	Bournemouth Gas and Water { 4 p.c. Deb.	..	65—70	...
992,045	Stk.	Feb. 9	14	56/—	Brentford A Consolid.	261—266	88—93	...
734,920	,,	,,	11	55/—	Do. B New	204—209	88—93	92—93
55,000	,,	,,	5	5%	Do. 5 p.c. Pref.	109—111	80—85	...
221,400	,,	June 15	4	4%	Do. 4 p.c. Deb.	91—93	73—78*	...
214,775	,,	Mch. 15	11	11%	Brighton & Hove Orig.	208—213	165—170	...
244,200	,,	,,	8	8%	Do. A Ord. Stk.	154—159	118—123	...
1,287,500	Stk.	July 28	5	5%	Bristol 5 p.c. max.	..	..	90
530,000	20	Mch. 15	12$\frac{1}{2}$	10%	British	44—45	29—31	...
120,000	Stk.	Dec. 30	4	4%	Do. 4 p.c. Deb. Stk.	88—90	78—82	...
245,771	,,	,,	4	4%	Buenos Aires 4 p.c. Deb.	85—87	55—60	...
100,000	10	June 1	—	7%	Cape Town & Dis., Ltd.	1$\frac{1}{2}$—2$\frac{1}{2}$	6$\frac{1}{2}$—7$\frac{1}{2}$	...
100,000	10	Apl. 27	—	7%	Do. 4$\frac{1}{2}$ p.c. Pref.	4—6	5$\frac{1}{2}$—6$\frac{1}{2}$	...
100,000	Stk.	Dec. 30	4$\frac{1}{2}$	4$\frac{1}{2}$%	Do. 4$\frac{1}{2}$ p.c. Deb. Stk.	70—75	75—80	...
157,150	,,	Feb. 26	5	5%	Chester 5 p.c. Ord.	108—110	..	...
1,513,280	,,	Mch. 15	5/9/4	42/8	Commercial 4 p.c. Stk.	106—108	91—96	92—94
560,000	,,	,,	5$\frac{1}{2}$	38/4	Do. 3$\frac{1}{2}$ p.c. do.	103—105	92—97	93—93$\frac{1}{2}$
475,000	,,	June 15	3	3%	Do. 3 p.c. Deb. Stk.	69$\frac{1}{2}$—71$\frac{1}{2}$	55—60*	...
800,000	,,	Dec. 15	4	—	Continental Union, Ltd.	76—79	37—42	...
200,000	,,	,,	7	—	Do. 7 p.c. Pref.	115—118	55—60	...
51,600	,,	Feb. 23	15	15%	Croydon A 10 p.c.	..	200—210	...
278,400	—	,,	12	12%	Croydon B and C 7 p.c.	..	160—170	...
492,270	Stk.	—	6	4$\frac{1}{2}$%	Derby Con. Stk.	123—125	80	...
55,000	,,	—	4	4%	Do. Deb. Stk.	102—104	65	...
1,002,180	10	Jan. 26	10	5/0	European, Ltd.	17$\frac{1}{2}$—18	12—13	12$\frac{1}{2}$—12$\frac{3}{4}$
16,298,975	Stk.	Feb. 23	1/17/4	46/8	Gas Light and Coke { 4 p.c. Ord.	98—102	95—98	94—96$\frac{1}{2}$
2,600,000	,,	,,	3$\frac{1}{2}$	35/—	Gas Light and Coke { 3$\frac{1}{2}$ p.c. max.	76—79	65—68	65—65$\frac{1}{2}$
4,062,235	,,	,,	4	4%	Gas Light and Coke { 4 p.c. Con. Pref.	96—99	77—81	77—79$\frac{1}{2}$
4,674,850	,,	June 15	3	3%	Gas Light and Coke { 3 p.c. Con. Deb.	72$\frac{1}{2}$—74$\frac{1}{2}$	61—64*	62$\frac{1}{2}$—64$\frac{1}{2}$
130,000	,,	Dec. 11	10	10%	Gas Light and Coke { 10 p.c. Bonds	..	..	...
82,500	,,	Sept. 14	5	3$\frac{1}{2}$%	Hastings & St. L. 5 p.c.	..	..	...
258,740	,,	Mch. 15	3$\frac{1}{2}$	2$\frac{1}{2}$%	Do. 3$\frac{1}{2}$ p.c.	87—89	52—57	...
70,000	,,	May 18	11	5%	Hongkong & China, Ltd.	16$\frac{1}{2}$—16$\frac{3}{4}$	6—7	...
86,600	Stk.	Mch. 15	9	9$\frac{1}{2}$%	Hornsey 7 p.c.	..	115—120	...
131,000	,,	,,	7$\frac{1}{2}$	7$\frac{1}{2}$%	Ilford A and C	151—154	120—130	...
65,780	,,	,,	6$\frac{1}{2}$	5$\frac{1}{2}$%	Do. B	115—118	100—110	...
65,500	,,	Dec. 30	4	4%	Do. 4 p.c. Deb.	92—94	75—80	...
1,976,000	,,	May 18	9	5%	Imperial Continental	150—160	162—167	163—165$\frac{1}{2}$
404,800	,,	Feb. 9	3$\frac{1}{2}$	3$\frac{1}{2}$%	Do. 3$\frac{1}{2}$ p.c. Deb. Red.	84—86	75—80	78$\frac{1}{4}$—79
235,242	,,	Mch. 15	6$\frac{1}{2}$	6$\frac{1}{2}$%	Lea Bridge Ord. 5 p.c.	119—121	83—88	...
2,498,905	,,	Feb. 26	10	37/6	Liverpool 5 p.c. Ord. { A. B.	211—213 / 146—148	..	...
306,083	,,	June 26	4	4%	Do. 4 p.c. Pr. Deb. Stk.	..	..	...
165,736	,	Feb. 23	7/5/6	6%	Maidstone 5 p.c.	..	80—85	...
63,480	,,	Dec. 30	—	3%	Do. 3 p.c. Deb	..	48—51	...
75,000	5	June 11	6	3%	Malta & Mediterranean Met. of Melbourne { 4$\frac{1}{2}$ p.c. Deb.	4$\frac{1}{8}$—4$\frac{1}{4}$	3$\frac{1}{4}$—3$\frac{1}{2}$	...
250,000	100	Apl. 3	4$\frac{1}{2}$	4$\frac{1}{2}$%	Monte Video, Ltd.	99—101	91—98	97$\frac{1}{2}$
541,920	Stk.	June 1	4	4%	Newcastle & Gatsh'dCon.	11$\frac{1}{2}$—12	63—68	...
1,875,892	,,	Feb. 23	4$\frac{1}{2}$	4$\frac{1}{2}$%	Do. 3$\frac{1}{2}$ p.c. Deb.	98$\frac{1}{4}$—99$\frac{1}{2}$	83$\frac{1}{2}$—84$\frac{1}{2}$	...
529,705	,,	Dec. 30	3$\frac{1}{2}$	3$\frac{1}{2}$%	North Middlesex 10 p.c.	82—83	69—71	...
15,000	10	Aug. 26	—	7/6	,, ,, 7 p.c.	..	12$\frac{1}{2}$—13	...
55,940	10	Mch. 15	7/14/0	10/12$\frac{1}{2}$	Oriental, Ltd.	14—15	10$\frac{1}{2}$—11$\frac{1}{2}$	...
300,000	Stk.	May 18	8	8%	Ottoman, Ltd.	117—122	90—95	95
60,000	5	—	10	—	Plym'th & Stonh'se 5 p.c.	7$\frac{1}{4}$—7$\frac{1}{2}$	2—3	...
188,120	Stk.	Dec. 30	—	6%	Portsea Island, B	..	95—100	...
60,000	50	Mch. 15	13	62/6	Do. C	128—131	87—90	...
100,000	50	,,	12	57/6	Primitiva Ord.	118—121	78—83	...
249,980	5	—	8	—	Do. 5 p.c. Pref.	5$\frac{1}{2}$—6	$\frac{1}{2}$—1	14/—16/—
499,960	5	—	5	—	Do. 4 p.c. Deb.	4$\frac{1}{2}$—5	2—2$\frac{1}{2}$	40/—42/6
521,600	100	June 1	4	4%	Do. ,, ,, 1911	91—93	74—76	75
600,000	Stk.	Jan. 26	4	4%	River Plate 4 p.c. Deb.	..	55—60	57
346,198	,,	Dec. 30	4	4%	San Paulo { 6 p.c. Pref.	85—87	55—60	58
150,000	10	Mch. 30	6	6/—	San Paulo { 5 p.c. Deb.	10$\frac{1}{2}$—11	5$\frac{1}{2}$—6$\frac{1}{2}$	...
125,000	50	Jan. 3	5	5%	Sheffield A	47—49	36—39	...
135,000	Stk.	Mch. 15	10	5%	Do. B	223—224	89—92	...
209,984	,,	,,	10	5%	Do. C	222—224	89—92	...
523,500	,,	,,	10	5%	Shrewsbury 5 p.c.	220—222	89—92	...
133,201	Stk.	Sept. 15	4	4%	South African	..	..	...
90,000	10	Oct. 28	9	8%	South Met. Ord.	10$\frac{1}{2}$—11$\frac{1}{2}$	7—9	...
6,609,895	Stk.	Feb. 9	5/4/0	5%	Do. Red. Pref.	111—113	96—99	97$\frac{1}{2}$—97$\frac{1}{2}$
250,000	,,	Jan. 12	—	5%	Do. 3 p.c. Deb.	..	96—98	...
1,895,445	,,	,,	3	3%	South Shields Con. Stk.	72$\frac{1}{2}$—74$\frac{1}{2}$	60—63	62
224,820	,,	Feb. 23	8$\frac{1}{2}$	8$\frac{1}{2}$%	S'th Suburb'n Ord. 5 p.c.	157—159	106—108	...
1,087,795	,,	,,	6	5$\frac{1}{2}$%	Do. 5 p.c. Deb. Stk.	114—116	98—103	100—101$\frac{3}{4}$
368,837	,,	June 15	5	5%	Southampton Ord.	116—118	93—98*	97—99$\frac{1}{2}$
647,740	,,	May 18	5	5%	Do. 4 p.c. Deb. Stk.	99—102	70—75	...
121,275	,,	Dec. 30	4	4%	Tottenham District { A 5 p.c.	..	65—70	...
120,000	,,	Feb. 23	—	7$\frac{1}{2}$%	Tottenham District { B 3$\frac{1}{2}$ p.c.	135—138	112—117	114$\frac{1}{2}$—115
782,275	,,	,,	6	5$\frac{1}{2}$%	Tottenham District { 4 p.c. Deb.	115—117	98—103	99—100$\frac{1}{2}$
181,255	,,	June 15	4	4%	Tuscan, Ltd.	87—89	75—80*	...
182,380	10	Dec. 30	5	—	Do. 5 p.c. Deb. Red.	5—6	1—2	...
149,900	10	July 1	5	5%	Tynemouth 5 p.c. max.	93—95	45—50	...
236,476	Stk.	Mch. 15	5	3$\frac{1}{2}$%	Wandsworth, Wimbledon, and Epsom—	108$\frac{1}{2}$—109	71—73	...
30,000	,,	Mch. 15	8$\frac{1}{2}$	66/3	Wandsworth A 5 p.c.	151—156	110—115	...
253,636	,,	,,	6$\frac{1}{2}$	51/3	Do. B 3$\frac{1}{2}$ p.c.	129—134	95—100	...
108,075	,,	,,	—	46/4$\frac{1}{2}$	Do. C	..	85—90	89
140,865	,,	,,	—	46/4$\frac{1}{2}$	New Ordinary	..	85—90	...
352,000	,,	,,	6$\frac{1}{2}$	45/—	Wimbledon 5 p.c.	117—122	92—97	95—95$\frac{1}{2}$
98,000	,,	,,	6$\frac{1}{2}$	50/—	Epsom 5 p.c.	121—126	95—100	...
88,416	,,	Dec. 30	3	3%	3 p.c Deb. Stk.	66—69	57—60	58

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Fatality at the Newmarket Gas-Works.

A sad fatality occurred at the Newmarket Gas-Works on Monday morning last week—the only fatal mishap which has taken place upon the premises since the establishment of the Company. Mr. Ernest Thomas Wright, the Company's foreman, was found lying alongside a gasholder with his head and shoulder in the cup of the holder, and his face under water. He had evidently gone to the spot to replace a plate on the holder, and after getting the old plate off had been overcome by the escaping gas. Efforts were made to resuscitate him; but life had for some time been extinct. Mr. Wright, who was 58 years of age, had been in the Company's service for 35 years, and was a much-valued employee. At the inquest, Mr. J. H. Troughton (the Secretary and Manager) said he had given general instructions that no one should do anything of a dangerous nature without having another man with him. This particular job would take fifteen minutes, or possibly less. Mr. Wright's son agreed that if his father wanted a man to go with him on this job, he had only to give orders to this effect. The Jury returned a verdict of "Death from asphyxia;" adding a rider that notices should be posted up in the works that any man engaged on this or other work of a dangerous nature should be accompanied by another.

Truro Gas Company's Reduction.—The Truro Gas Company have decided to reduce the price of gas from July 1 to 1s. 5d. per therm, which is equivalent to 6s. 4½d. per 1000 c.ft., and represents a reduction of 7½d. per 1000 c.ft. There will also be a revision of the scale of discounts which will represent a further advantage to the consumers.

Gas Light and Coke Company's Price.—The Gas Light and Coke Company announce that there will be a substantial reduction in the price of gas as from the reading of the meters for the June quarter. The actual amount of the reduction will, it is stated, be intimated as soon as possible after the closing of the Company's accounts for the half year.

Gas Prices in Scotland.—A reduction of the gas charges is announced at Carnoustie of 1s. o½d., bringing the price down to 6s. o½d. per 1000 c.ft. The new vertical retorts have given every satisfaction. At Larkhall, the rate is lowered to 6s. 3d. per 1000 c.ft. The price to ordinary consumers at Arbroath is to be 3s. 9d. per 1000 c.ft., a reduction of 5d., with varying concessions to large power users.

Further Reduction in Price at Yarmouth.—The Directors of the Great Yarmouth Gas Company intimate that from and after the reading of the meters for the current quarter, a further reduction (making the third since September last) will be made in the price of gas amounting to 5 p.ct., with additional rebates depending upon the total of the annual account for gas supplied. In view of the popularity of the Company's system of discounts previously in operation (but which had to be withdrawn during the war years), the Directors have decided to restore the pre-war system of discounts. The reductions will therefore be: To all consumers a reduction of 5 p.ct.; on annual accounts of £100 and upwards to £200, an additional 2½ p.ct., making 7½ p.ct. in all; on annual accounts of £200 and over, an additional 5 p.ct., making 10 p.ct. in all. These discount reductions will be allowable on accounts for gas only, and conditional upon payment by fixed dates. In the case of prepayment meter consumers, the meters will not be altered to give the increased quantity of gas equivalent to this further reduction of 5 p.ct. in price, as the Directors hope to be in a position to make still further concessions; but the consumer will receive the reduction as a cash rebate, in addition to the rebate of 1s. per 1000 c.ft. now being given. With two previous reductions, the total reduction since September last is equal to 1s. 4d. per 1000 c.ft. to ordinary and slot consumers, and 1s. 3d. per 1000 c.ft. to power consumers.

Price Lowered at Dunfermline.—The Town Council of Dunfermline, at their meeting last week, decided to reduce the price of gas, as from the last readings in March, by 9d. per 1000 c ft., making the new prices 3s. 2d., less discounts, and 2s. 2d. to 1s. 10d. for power and industrial purposes.

Worthing Gas Company's Price Reduction.—The Worthing Gas Light and Coke Company announce that, as from the date of the reading of the meter indexes for the midsummer quarter, the price of gas will be reduced to all consumers 3·5d. per therm. The reduction is equal to 2·82d. per 1000 c.ft., and represents a gain to consumers of over £2800 per annum.

Stanton Iron-Works Company.—The accounts of the Company for the year ended March 31 show that the profit, after providing for taxation and including dividends received from the Holwell Iron Company and other investments, was £140,360, with £136,495 brought in —making £276,855. A final dividend is recommended of 6 p.ct. on the ordinary shares, free of tax, making 10 p.ct.; the placing to reserve for depreciation of new works £20,000; carrying forward £128,827. Extensive works laid down at Stanton for the manufacture of "Spun" iron pipes, under manufacturing rights acquired from the International De Lavaud Manufacturing Corporation, are approaching completion. An appreciable quantity of orders has been obtained for "Stanton-Hume" concrete pipes manufactured under licences from the Hume Pipe and Concrete Construction Company. New works for making these pipes are now completed. In consequence of the conditions prevailing in the iron trade, the Riddings works have been completely shut-down, and out of nine furnaces at the Stanton works only four are in operation. At Holwell out of five furnaces only two are in operation.

Hire Charges for Cookers at Stafford.—A recommendation by the Gas Committee was made to the Stafford Town Council last week in reference to the hire charge for gas-cookers: (*a*) That after the June readings of the meters have been taken, the Council revert to the simple hire system, whereby consumers are charged a sum inclusive of repairs, &c.; (*b*) that the system whereby no charge is made in respect of the hire of gas-cookers after ten years' continuous use by the consumer be discontinued. Mr. Hindle moved that the paragraph be referred back. He said the Council were told at the last meeting that the price of gas to the quarterly consumers was to be reduced; and now it seemed that the Committee were trying to nullify that advantage by charging for the hire of gas-cookers after ten years' use. Alderman Mycock explained that no alteration was to be made in the charge for cookers to quarterly consumers; but the Committee were going to undertake the cost of keeping them in repair. The prepayment consumers who had their cookers free would continue to do so. Alderman Westhead said it was a reversion to pre-war simple hire system, in lieu of the hire-purchase system, and would be to the benefit of those using gas-cookers. The amendment was lost, and the recommendation was adopted.

The annual conversazione of the Institution of Civil Engineers has been fixed to take place on Tuesday, June 27, at the headquarters of the Institution, at 8.30 p.m.

The Town Clerk has reported to the St. Helens Corporation that the Minister of Health has sanctioned the borrowing of the sum of £5000 for re-sheeting No. 2 gasholder at the works.

Mr. Frank Ayres, a clerk employed at the Wandsworth Gas-Works, died in St. James's Infirmary, Wandsworth Common, on Sunday, from injuries received in a motor-car accident on Saturday afternoon. With others he was riding in a small motor-car along the Merton Road, when, in rounding a curve, the car came into collision with a motor-lorry.

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APPOINTMENTS, &c., WANTED.

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Address, No. 7118, "GAS JOURNAL," 11, BOLT COURT, FLEET STREET, E.C. 4.

PLANT, &c., FOR SALE & WANTED

RAILWAY Tank Wagons for Disposal, Rectangular and Cylindrical, specially suitable for Oil, Inflammable Liquids, also Acids. Inquiries invited.
BROTHERTON & Co., LTD., LEEDS.

FIRTH BLAKELEY, SONS, & CO., Ltd., Church Fenton, Leeds, have the following Plant to offer:
BEDS of 6's and 8's 22 by 15 ○ 6 in. Pipes. Cheap before removal. Could refix or Tender including Retorts and Settings.
GASHOLDERS—800,000, 172,000, 50,000, 40,000, and Two 5000 capacity.
"HOLMES," "KIRKHAM" & "CLAPHAMS" WASHER-SCRUBBERS, 10 in., 12 in., and 14 in. Connections.
"LIVESEY" WASHERS, 12 in. & 8 in. Connections.
CONDENSERS. Sets of 4 Annular, 8 in. & 12 in. Connections. Sets of 6 in. & 9 in. Vertical Pipes. Water Tube Condenser 15 in. Connections.
EXHAUSTERS and ENGINES. Waller's & Donkin's from 50,000 to 2000 capacity per hour, Steam, Gas, and Belt driven.
TOWER SCRUBBERS, 5 ft. by 40 ft., 4 ft. 6 in. by 36 ft., 4 ft. by 20 ft., 3 ft. by 13 ft.
PURIFIERS. Sets of 6 ft., 8 ft., 10 ft., 12 ft., and 25 ft. square.
STATION METERS and GOVERNORS. 40,000 to 2000 per hour, overhauled.
Every Requisite for Gas-Works supplied. We undertake Delivery and Erection Complete, and solicit inquiries.
DISMANTLING SPECIALISTS. Surplus and obsolete Plant purchased. Best prices paid. Removal by expert staff.
FIRTH BLAKELEY, SONS, & Co., LTD.,
CHURCH FENTON, LEEDS.

STEAM-BOILERS—All Sizes, Vertical, Loco-type, Cornish, Portable, and Other Types of Boilers.
Apply GRANTHAM BOILER & CRANK Co., LTD., GRANTHAM.

FOR SALE, at a reasonable price, COMPLETE COAL-GAS PLANT to Manufacture 350,000 c.ft. per twenty-four hours, including Four Gasholders of respective capacities of 106,000, 94,000, 50,000 and 46,000 c.ft.; Complete WATER-GAS PLANT to Generate 500,000 c.ft. per twenty-four hours, with Relief Holder, Boilers, &c.
Both plants are in First-Class Working Condition, and suitable for re-erection.
For list, apply to Mr. W. J. GRAY, Secretary, ALLIANCE AND DUBLIN CONSUMERS' GAS COMPANY, D'OLIER STREET, DUBLIN.

CONTRACTS OPEN.

COUNTY BOROUGH OF WALSALL.
(GAS DEPARTMENT.)
THE Gas Committee are desirous of receiving TENDERS for the Supply of SCREENED GAS COAL and NUTS, to be Delivered to these Works.
The quantity required over Twelve Months would be about 30,000 Tons, to be supplied in equal Monthly Quantities.
Quotations must be for Three months, for part of the above quantity, or for shorter periods.
The Corporation will reserve the right to provide their own Wagons for carrying the bulk of the Supplies.
Tenders to be sent in by the 26th of June next, endorsed "Coal," and addressed to the Chairman of the Gas Committee, Gas-Works, Pleck, Walsall.
Tender Forms are not provided.
The Gas Committee do not bind themselves to accept the lowest or any Tender, and reserve to themselves the right to allocate what proportion they think proper.
B. W. SMITH,
Engineer and Manager.
Gas-Works,
Pleck, Walsall,
June 12, 1922.

URBAN DISTRICT COUNCIL OF DENTON.
(GAS DEPARTMENT.)
THE above Council invite Tenders for the Supply of about 6000 Tons of SCREENED GAS COAL, COBBLES, NUTS, or ROUGH SLACK, suitable for Vertical Retorts, to be Delivered in the Council's Gas-Works siding at Denton, near Manchester, on the London and North Western Railway as and when required by the Council during the year ending June 30, 1923.
Tenders, endorsed "Coal," should be sent in to the undersigned not later than the 28th of June, 1922.
The Council do not bind themselves to accept the lowest or any Tender nor to purchase the whole quantity required from any one person tendering.
H. C. HANDLEY,
Engineer and Manager.
Gas-Works, Denton,
near Manchester,
June 16, 1922.

COMPANY NOTICES.

SOUTH SUBURBAN GAS COMPANY.
NOTICE is hereby given that the TRANSFER BOOKS Relating to the FIVE PER CENT. ORDINARY STOCK of this Company WILL BE CLOSED from the 3rd to the 31st of July prox., both days inclusive.
By order of the Board,
WILFRID WASTELL,
Secretary.
Head Offices,
Lower Sydenham, S.E. 26
June 21, 1922.

Continued on p. 700.